

COMPREHENSIVE LONG-TERM ENVIRONMENTAL ACTION NAVY (CLEAN I)
Northern and Central California, Nevada, and Utah
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REMEDIAL INVESTIGATION/FEASIBILITY STUDY
DATA TRANSMITTAL MEMORANDUM
SITES 1, 2, 3, RUNWAY AREA, 6, 7A, 7B,
7C, 9, 10B, 11, 13, 15, 16, AND 19

FINAL
VOLUME 1 OF 2
TEXT, TABLES, AND FIGURES

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DRAFT
ADDENDUM TO THE
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
DATA TRANSMITTAL MEMORANDUM
SITE 1 AND SITE 2 RADIATION SURVEY REPORT

DATED 01 JUNE 1996

IS FILED AS ADMINISTRATIVE RECORD NO.
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10B, 11, 13, 15, 16, and 19**

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LIST OF ABBREVIATIONS AND ACRONYMS

AVGAS	aviation gasoline
bgs	below ground surface
BOD	biochemical oxygen demand
BTEX	benzene, toluene, ethylbenzene, and xylenes
CLEAN	Comprehensive Long-term Environmental Action Navy
CLP	Contract Laboratory Program
COD	chemical oxygen demand
CPT	cone penetrometer test
CRDL	contract required detection limit
CRQL	contract required quantitation limit
CTO	Contract Task Order
DCA	dichloroethane
DCE	dichloroethene
DHS	Department of Health Services
DI	deionized
DNAPL	dense non-aqueous phase liquid
DQO	data quality objective
DTSC	Department of Toxic Substances Control
EFA-West	Department of the Navy, Western Division, Naval Facilities Engineering Command
EM	electromagnetic
EPA	U.S. Environmental Protection Agency
GPR	ground penetrating radar
HLA	Harding Lawson Associates
HSA	hollow stem auger
IDL	instrument detection limits
IMF	Intermediate Maintenance Facility
IR	Installation Restoration
IRP	Installation Restoration Program
LCS	laboratory control sample
LUFT	leaking underground fuel tank
MAG	magnetic
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MLLW	mean lower low water
MS	matrix spike
MSA	method of standard addition
MSD	matrix spike duplicate
NACIP	Naval Assessment and Control of Installation Pollutants
NARF	Naval Air Rework Facility
NAS	Naval Air Station
NPS	non-point source
OC	organochlorine

LIST OF ABBREVIATIONS AND ACRONYMS (Continued)

PAH	polycyclic aromatic hydrocarbon
PARCC	precision, accuracy, representativeness, completeness, and comparability
PCB	polychlorinated biphenyl
PCE	perchloroethylene/tetrachloroethene
PEST	PCBs/pesticides
PID	photoionization detector
PRC	PRC Environmental Management, Inc.
PVC	polyvinyl chloride
PWC	Public Works Center
QA	quality assurance
QAPP	quality assurance project plan
QA/QC	quality assurance/quality control
QC	quality control
RAS	routine analytical services
RCRA	Resource Conservation and Recovery Act
RI	remedial investigation
RI/FS	remedial investigation/feasibility study
RPD	relative percent difference
RWQCB	Regional Water Quality Control Board
SAS	special analytical services
STI	statistical tolerance interval
STLC	soluble threshold limit concentration
SVOA	semivolatile organic analysis
SVOC	semivolatile organic compound
SWAT	Solid Waste Water Quality Assessment Test
SWRCB	State Water Resources Control Board
TCA	trichloroethane
TCE	trichloroethene
TDS	total dissolved solids
TOC	total organic carbon
TPH	total petroleum hydrocarbons
TPH-E	total petroleum hydrocarbons-extractables
TPH-P	total petroleum hydrocarbons-purgeable
TRPH	total recoverable petroleum hydrocarbon
UST	underground storage tank
VOA	volatile organic analysis
VOC	volatile organic compound

EXECUTIVE SUMMARY

PRC Environmental Management Inc. (PRC) and its team subcontractor, Montgomery Watson (the PRC team), conducted field sampling to collect additional soil and groundwater data at 15 Naval Air Station (NAS) Alameda, Installation Restoration Program (IRP) sites: 1, 2, 3, Runway Area, 6, 7A, 7B, 7C, 9, 10B, 11, 13, 15, 16, and 19 for remedial investigation/feasibility study (RI/FS) evaluation. The purpose of the current investigation was to collect additional chemical, geologic, and hydrogeologic data at the 15 IRP sites, where data gaps existed from previous studies. The purpose of this data transmittal memorandum is to summarize the field activities, analytical results, and the first quarter of groundwater sampling (one of the four quarters planned) conducted under contract task order (CTO) 280. This memorandum is not intended to present detailed data evaluation and interpretation, but presents the data in a tabulated format, makes a brief, qualitative comparison to data previously collected at each site, and evaluates the sufficiency of site characterization for RI/FS evaluation. Detailed evaluation and interpretation will be presented in future RI reports for these sites.

The PRC team conducted field activities at 15 sites at NAS Alameda, pursuant to three field sampling plan documents: "Follow-On Field Sampling Plan, RI/FS Phase 2A" (Phase 2A FSP; PRC and Montgomery Watson 1994a); "Follow-On Field Sampling Plan, RI/FS Phases 2B and 3" (Phases 2B and 3 FSP; PRC and Montgomery Watson 1994b); and "Follow-On Field Sampling Plan, RI/FS Phases 5 and 6" (Phases 5 and 6 FSP; PRC and Montgomery Watson 1994c). The three field sampling plans were prepared based on previous data collected at these sites and the quality assurance project plan (QAPP; PRC and Montgomery Watson 1993c). Field activities were performed in conformance with the three documents, with the exception of circumstantial field variances that are noted in the text of this document. The field variances were due to either changes in the field program or modifications to sampling techniques and did not hinder the data collection. Field variances, when necessary, were performed in such a way as to ensure meeting all data quality objectives. Field activities included cone penetrometer testing (CPT), HydroPunch groundwater sampling, GeoProbe groundwater sampling, non-point source (NPS) sampling, shallow soil sampling, surface soil sampling, shallow soil boring and monitoring well installation, deep monitoring well installation, geophysical survey, drain line video survey, and first quarter groundwater sampling.

The lithologic findings at the 15 sites appear consistent with previous studies, which indicate a first water-bearing zone separated from a lower second water-bearing zone by a less permeable Bay Mud unit, and a paleochannel composed of silt and clay trending east to west through the landfills. The paleochannel was confirmed to extend at least through the length of the Runway Area as part of this investigation. Current findings indicate the absence of a Bay Mud unit beneath the more inland sites (7C, 9, 10B, 13, 16, and 19). A relatively laterally extensive sand lense within the Bay Mud unit was detected during the CPT phase in the vicinity of Sites 1, 2, and the Runway Area.

Groundwater elevations were obtained from the second quarter of groundwater sampling because many of the monitoring wells were not installed in time to measure depth-to-groundwater during the first quarter. All wells were sampled during the first quarter of groundwater sampling; analytical results are presented in this document. Second quarter groundwater elevation data indicate that groundwater flow directions in the first water-bearing zone appear to be influenced by utilities or utility trenches in the eastern portion of the base (Sites 3, 6, 7A, 7C, 9, 10B, 13, 16, and 19), resulting in variable flow direction. Second quarter groundwater elevation data in the first water-bearing zone in the western portion of the base (Sites 1, 2, and the Runway Area) indicate radial flow from the center of the Runway Area toward the north, west, and south.

Additional groundwater monitoring wells were installed in the second water-bearing zone as part of this investigation. Second quarter groundwater elevation data indicate that groundwater flow directions in the second water-bearing zone in the eastern portion of the base are predominantly westward, toward the Seaplane Lagoon. Second quarter groundwater elevation data in the second water-bearing zone in the western portion of the base indicate radial flow from the center of the Runway Area toward the north, west, and south.

Analytical results were generally consistent with previous investigations' analytical results in terms of the contaminants detected and in terms of the concentration ranges previously found in soil and shallow groundwater at the sites addressed as part of the current investigation. The nature and extent of chemicals of interest in soil and groundwater appear to have been adequately characterized for the purpose of conducting an RI/FS at Sites 1, 2, Runway Area, 6, 9, 15, 16, and 19. Some uncertainty regarding the extent of potential chemicals of interest in groundwater still exists at Sites 3, 7A, 7B and 11, 7C, 10B, and 13. Uncertainties at Sites 3 and 7A include the extent of petroleum-related

volatile organic compounds (VOCs) and total petroleum hydrocarbons-extractable (TPH-E) in the second water-bearing zone. VOCs that are typically associated with industrial solvents were detected in the first water-bearing zone throughout Sites 7B and 11; and TPH-E was detected in groundwater samples obtained from the deep zone at Sites 7C, 10B, and 13. If, based on the detected levels of chemicals found at these sites, a health or environmental risk exists, then the need for additional sampling will be evaluated.

In addition to the work performed at the CTO 280 sites, limited field activities and sampling were also performed at Sites 4, 5, and 10A and are included as Attachment A in this document. Field activities and sampling were conducted at these sites to fill in minor data gaps from initial follow-on field activities performed during the winter and spring of 1994 (PRC and Montgomery Watson 1995).

SECTION 1.0

1.0 INTRODUCTION

A follow-on field investigation was conducted at Installation Restoration Program (IRP) Sites 1, 2, 3, Runway Area, 6, 7A, 7B, 7C, 9, 10B, 11, 13, 15, 16, and 19 at the Naval Air Station (NAS) Alameda, California, for remedial investigation/feasibility study (RI/FS) evaluation. The purpose of the investigation was to collect additional chemical, geologic and hydrogeologic data at the 15 IRP sites, where data gaps existed from previous studies. The field investigation began in June 1994, and consisted of drilling, cone penetrometer testing (CPT), soil sampling, non-point source (NPS) sampling, well installation, HydroPunch II® (HydroPunch) sampling, GeoProbe sampling, geophysical surveys, and a video survey. Four quarters of groundwater sampling are also scheduled for the 15 sites. The first quarter groundwater sampling was conducted in September 1994; the results of that sampling round are presented in this document.

The follow-on work was conducted in accordance with three field sampling plans: "Follow-On Field Sampling Plan, Remedial Investigation/Feasibility Study, Phase 2A" (Phase 2A FSP; PRC and Montgomery Watson 1994a); "Follow-On Field Sampling Plan, Remedial Investigation/Feasibility Study, Phases 2B and 3" (Phases 2B and 3 FSP; PRC and Montgomery Watson 1994b); and "Follow-On Field Sampling Plan, Remedial Investigation/Feasibility Study, Phases 5 and 6" (Phases 5 and 6 FSP; PRC and Montgomery Watson 1994c). The three sampling plans were approved by the Department of Toxic Substances Control (DTSC).

1.1 OBJECTIVES OF THE CTO 280 FIELD INVESTIGATION AND DATA TRANSMITTAL MEMORANDUM

The objective of the field investigation was to collect sufficient chemical, geologic, and hydrogeologic data for a Remedial Investigation (RI) evaluation. CPT was conducted to assess the thickness of the second water-bearing zone and Bay Mud unit, and to evaluate base-wide geology. HydroPunch samples were obtained from the second water-bearing zone to assist in the placement of deep wells; a small percentage of HydroPunch samples were also obtained from the first water-bearing zone to assist in the placement of shallow wells. Soil samples were collected from soil borings, monitoring wells, and surface soil samples, and submitted for chemical analyses in order to assess the nature and extent of chemicals of interest in soil. Shallow and deep monitoring wells were installed in the first

and second water-bearing zones (referred to as deep zone in the southeastern portion of the base due to the absence of the Bay Mud aquitard), respectively, to assess groundwater quality and groundwater gradient. NPS samples were obtained from storm drain manholes and catch basins to assess whether the storm drains were acting as conduits for contaminant migration. A geophysical survey was also conducted at two of the sites to locate underground storage tanks, and a drain line video survey was conducted at one site to assess drain line integrity.

The purpose of this data transmittal memorandum is to summarize the activities and results of the field investigation and the first quarter of groundwater sampling. The memorandum provides timely and pertinent information to guide future IRP work at NAS Alameda, if required. The memorandum is not intended to present interpretation of the data or assessment of human health or environmental risks; this will be addressed in the RI. The scope of work also includes a brief qualitative comparison of recent findings with findings from previous investigations at the CTO 280 sites, and addresses whether sufficient data are currently available to complete the RI/FS evaluation at each site. The comprehensive RI report, which will include an evaluation of fate and transport of chemicals and human health and environmental risk assessment, will be completed after the fourth quarter of groundwater sampling is conducted in August 1995.

1.2 DOCUMENT ORGANIZATION

This data transmittal memorandum is organized to give a brief background of the subsurface conditions at Alameda NAS, followed by a summary of the CTO 280 field program and data quality. The remainder of the document summarizes the results of the field investigation and the first quarter of groundwater sampling by site.

Additional field work and analyses were also conducted during this investigation at Sites 4, 5, and 10A, in order to address data gaps from an earlier follow-on field investigation conducted at these sites. The earlier follow-on investigation was conducted under a different contract task order (CTO 260), which is summarized in the CTO 260 Data Transmittal Memorandum, which is analogous to this document for IRP Sites 4, 5, 8, 10A, 12, and 14 (PRC and Montgomery Watson, 1995). The additional work conducted at Sites 4, 5, and 10A is briefly discussed in Section 19.0; analytical results are included as Attachment A at the end of this document.

The memorandum is organized as follows:

- Section 2.0 - Background
- Section 3.0 - Overview of Follow-On Field Program Conducted Under CTO 280
- Section 4.0 - Data Quality
- Sections 5.0 through 18.0 discuss the background and analytical results of each CTO 280 site. Each section is organized as follows:
 - Site Description
 - Previous Investigations
 - Findings from Previous Investigations
 - CTO 280 Follow-On Field Investigation
 - CTO 280 Follow-On Field Investigation Analytical Results
 - Summary of Site Characterization
- Section 19.0 - Sites 4, 5, and 10A (Non-CTO 280 Sites)

The analytical data are presented in tabular format, with the discussion limited to:

- a qualitative assessment of the consistency between data obtained from previous investigations and this investigation; and
- the completeness of data available for performing an RI/FS at each site.

1.3 PRESENTATION OF THE DATA

Tabulated analytical results from this investigation are presented in Sections 5 through 18, with reference to attached figures for sampling locations. The tables include soil analytical results, groundwater analytical results, NPS sampling analytical results, and quality control sample analytical results. Additionally, soil and groundwater samples were compared to preliminary standards for metals that were utilized for earlier investigations as a general indicator of the potential extent of elevated concentrations of metals in soil and groundwater. The comparison is also presented in tabular format.

Soil Analytical Results

The chemicals of interest for soil at each site include organic compounds and metals. The chemicals of interest were selected based on the analytical results of previous investigations and past and present industrial activity at NAS Alameda. Organic compounds (volatile organic compounds [VOCs], semivolatile organic compounds [SVOCs], pesticides, polychlorinated biphenyls [PCBs], dioxins, and total petroleum hydrocarbons [TPH]) that were detected above contract required quantitation limits (CRQL) are presented in tabular format in each of the site-specific sections. A complete listing of soil and sediment analytical data are included in Attachment B under separate cover. Attachment B has a limited distribution due to the quantity of paper required to reproduce it.

Metals detected above the contract required detection limit (CRDL) are presented separately as Attachment C (the sample's field I.D., as referenced in this text, is on the third line, except for GeoProbe samples, which are identified on the first line). Metals in soil are not tabulated within the text because they occur naturally in the environment and would require expansive tables. For the purpose of identifying potential areas of concern, metal concentrations in soil are compared to values that are 10 times the solubility threshold limit concentration (STLC). Metals that are above this value are tabulated in each site-specific section. The STLC is a value established by the State of California to define solid waste concentration levels that could pose a water quality threat if it were subjected to an acidic environment. For total metal concentrations in soil, the metal is considered to potentially pose a leachate problem when the concentration in the soil equals or exceeds 10 times the STLC value. STLC values are listed in Table 1-1. A more thorough discussion of this rationale, and an example calculation, is included as Attachment D.

Previous investigations identified the ubiquitous presence of polycyclic aromatic hydrocarbons (PAHs) at many of the IRP sites at NAS Alameda. Most of the SVOCs detected during this study were of the PAH class. For this technical memorandum, where appropriate, the following compounds are referred to as the "PAH class" as it pertains to soil and groundwater at NAS Alameda: acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, and pyrene.

Previous findings have also identified two classes of VOCs. VOCs that likely originate from a fuel or gasoline source, such as benzene, toluene, ethylbenzene, xylene (BTEX), are referred to as petroleum hydrocarbon-related VOCs. VOCs that likely originate from an industrial solvent source such as trichloroethene (TCE), 1,1,1-trichloroethane (TCA), 1,2-dichloroethene (1,2-DCE), 1,1-dichloroethane (1,1-DCA), vinyl chloride, tetrachloroethene (PCE), and 1,1-dichloroethene (1,1-DCE), are referred to as solvent-related VOCs.

Groundwater Analytical Results

The chemicals of interest for groundwater at each site include organic compounds and metals. The chemicals of interest were selected based on the analytical results of previous investigations and on past and present industrial activity at Alameda NAS. Organic compounds in groundwater that were detected above CRQLs (also referred to as detection limits) are presented in the site-specific data tables; total dissolved solids (TDSs) are also presented. Metals in groundwater that were detected above CRDLs (also referred to as detection limits) are presented separately in Attachment C. A complete listing of groundwater analytical data are included in Attachment B under a separate cover. Attachment B has a limited distribution due to the quantity of paper required to reproduce it.

Metal concentrations in groundwater were compared to reference levels that were used during the Phases 1 and 2A, Phases 2B and 3, and Phases 5 and 6 investigations. The same reference levels were used for this document to be consistent with these previous investigations. The reference levels used during previous investigations for metal concentrations in groundwater were developed from a statistical analysis of samples collected at NAS Alameda from groundwater monitoring well locations where there was no known history of chemical usage or industrial activity. Locations of the monitoring wells used to collect these samples are included as Attachment E. This statistical analysis included a concentration interval within which 95 percent of samples collected will fall 95 percent of the time, called the 95 percent/95 percent statistical tolerance interval (95/95 STI). Concentrations outside this range were identified as possibly indicative of conditions that are above or below ambient conditions for NAS Alameda. A thorough discussion of the evaluation of metals concentrations in groundwater is presented in the "Data Summary Report Background and Tidal Influence Studies and Additional Work at Sites 4 and 5" (PRC and James M. Montgomery, Consulting Engineers, Inc. [JMM] 1992a), and the Phases 5 and 6 Solid Waste Water Quality Assessment Test (SWAT; PRC and

Montgomery Watson 1993a). The comparison of metals to the 95/95 STI does not include the major cations, calcium, magnesium, iron, potassium, sodium, manganese, or aluminum, as these are common in the environment and unless excessively elevated, are typically not related to anthropogenic activities. The 95/95 STI for groundwater in the first water-bearing zone are shown on Table 1-2. Results of the first water-bearing zone groundwater samples collected under this CTO were compared to the 95/95 STI. Analytical metals data from the comparison are tabulated in each site-specific section. Because no background wells were installed in the second water-bearing zone, a statistical comparison can not be performed.

SECTION 2.0

2.0 BACKGROUND

This section presents a brief description of the hydrogeologic setting of NAS Alameda, based on previous and recent work conducted at the base, and a general discussion of first quarter groundwater gradients at CTO 280 sites. The discussion is brief and generalized; a more detailed interpretation of hydrogeology and groundwater gradients will be discussed in the RI report.

2.1 PHYSIOGRAPHIC AND HYDROGEOLOGIC SETTING OF NAS ALAMEDA

NAS Alameda, as shown in Figure 2-1, is located on the western end of Alameda Island, primarily in Alameda County, California. Alameda Island is within the San Francisco Bay basin and the Coast Range physiographic province of California. The air station is bounded to the north by the Oakland Inner Harbor, to the west by the San Francisco Bay, and to the south by the San Francisco Bay and the Seaplane Lagoon. Figure 2-2 shows the IRP site boundaries within the base.

The area now occupied by NAS Alameda was once covered by the waters of San Francisco Bay. Most of the land not under bay water was occupied by tidal flats. The tidal flats and subtidal deposits are considered a portion of the Holocene-age (within the last 11,000 years) Bay Mud stratigraphic unit (also called the Young Bay Mud or Bay Sediments). Figure 2-3 presents an idealized stratigraphic column for the NAS Alameda area with a comparison to stratigraphic nomenclature previously applied by Trask and Rolston (1951). Within the air station boundaries, the Holocene Bay Mud is overlain by hydraulically placed fill material, which comprises the uppermost water-bearing zone. The fill ranges up to 40 feet thick at the west end of the base, and thins toward the east. The Holocene Bay Mud underlies most of the base, with the exception of the southeastern portion of the base where there is no definable Holocene Bay Mud unit. The Bay Mud is up to 130 feet thick in the center of the Runway Area. The Bay Mud is typically underlain by Holocene and Late Pleistocene-age alluvial and eolian deposits. These deposits are roughly equivalent to the Merritt Sand unit described by Trask and Rolston (1951). The Merritt Sand is underlain by Late Pleistocene estuarine deposits consisting of dark greenish-gray silty clay in the vicinity of NAS Alameda and acts as an aquitard in this area.

Different authors have used different stratigraphic names and definitions for the Late Pleistocene estuarine deposits. Trask and Rolston (1951) used the name San Antonio Formation for sediments that are primarily composed of estuarine clays. However, Trask and Rolston's San Antonio Formation contains at least one thick and laterally extensive sand bed. In contrast to Trask and Rolston, Sloan (1992) called the Late Pleistocene estuarine deposits the Yerba Buena Mud. Sloan restricted the name Yerba Buena Mud to sediments composed of clay that can be expected to act as an aquitard. Although the stratigraphic relationships are not clear, Sloan (1981) believes that most of the San Antonio Formation is correlative with the Yerba Buena Mud. For the purpose of this data transmittal memorandum, the Late Pleistocene estuarine deposits are referred to as the Yerba Buena Mud.

The hydrological units of primary importance to the RI/FS investigation are the Merritt Sand, the Holocene Bay Mud, and the overlying artificial fill material. These units comprise the shallow aquifer. The shallow aquifer has two primary water-bearing zones; one above the Holocene Bay Mud in the fill material (referred to as the first water-bearing zone) and the second below the Holocene Bay Mud in the Merritt Sand (referred to as the second water-bearing zone). The Holocene Bay Mud contains more silt and sand in the western portion of the base, and is discontinuous in the southeastern portion of the base. In the southeastern portion of the base, all units above the Yerba Buena Mud are considered to be in hydraulic connection (PRC 1991), and, therefore, comprise one water-bearing unit. For this document, groundwater samples obtained from the top of the water table in the southeastern portion of the base are referred to as shallow zone samples and those collected from deep monitoring wells are referred to as deep zone samples. The alluvial portion of undifferentiated Pleistocene deposits, that underlay the Yerba Buena Mud, comprise a second, deeper aquifer, which was not studied during this investigation. Further interpretation of geologic data will be conducted during the RI/FS.

Groundwater contours were generated during previous investigations at the CTO 280 sites, using an adequate number of wells on the west side of the base (Sites 1, 2, and the Runway Area), and limited wells that existed on the east side of the base prior to CTO 280. During a tidal influence study in 1992, a tidal influence was noted at Sites 1, 2, the Runway Area, and Site 15. The tidal study corrected for tidal influence on water elevations and determined an average groundwater flow direction in the western portion of the base to be generally toward the San Francisco Bay. Based on

current first quarter groundwater level measurements from CTO 280 sites located east of the Runway Area, a preliminary assessment of groundwater flow in the first water-bearing zone indicates that flow directions are highly variable; groundwater contours are shown on Figure 2-4 and discussed later in this section. Four quarters of water level monitoring will be performed under CTO 280 to provide adequate data across seasonal variations for gradient characterization. The site characterization presented in the comprehensive RI report will include all data gathered during the IRP investigations.

2.2 REGIONAL LITHOLOGIC FINDINGS

The results from this investigation indicate that lithology and hydrogeology vary among the CTO 280 sites, which are shown on Figure 2-2. In general, different hydrogeologic regimes were noted in three areas of the base: the west end of the base (Sites 1, 2, and the Runway Area); the southeast portion of the base (Sites 3, 7B and 11, 7C, 9, 13, 16, and 19); and the remaining sites (Sites 6, 7A, and 15).

The west end of the base (Sites 1, 2, and the Runway Area) consists of a 30- to 40-foot-thick fill layer (thickest to the west) overlying the Holocene Bay Mud unit, which overlies a sand unit, which overlies the Yerba Buena Mud. The Bay Mud unit varies in thickness and consistency throughout Sites 1, 2, and the Runway Area. Extensive silty sand lenses were noted within the Bay Mud unit in the Runway Area, but the Bay Mud unit underlying the landfills to the west, is generally more clay rich. The thickness of the Bay Mud unit is greatest along a trough which extends southwest to northeast through the center of the landfills and Runway Area; reaching a thickness of up to 120 feet and thinning to approximately 20 feet north and south of the trough. The sand unit underlying the Bay Mud unit at Sites 1, 2, and the Runway Area varies in thickness from 0 feet (beneath the Bay Mud trough) to approximately 50 feet toward the north and south of the trough. In most cases, the sand appears to be Merritt Sand; however, the distinction is less obvious in some areas, as in the westernmost portion of the landfills. The Yerba Buena Mud underlies the sand unit as a stiff clay. A more detailed evaluation of the hydrogeology in these areas will be reported in the RI report.

The geology of the southeast portion of the base (Sites 3, 7B and 11, 7C, 9, 13, 16, and 19) generally consists of an approximately 10-foot-thick silty fill unit overlying more permeable sands (Merritt Sand), which in turn overlie the Yerba Buena Mud. No definable Bay Mud unit is present in

the southeast portion of the base, except at Sites 3, 7B, and 11, where a 3- to 4-foot-thick clay unit exists. The Merritt Sands are approximately 80 to 90 feet thick in this area.

The remaining sites (Sites 6, 7A and 15) generally conform to the lithology described in the idealized cross section presented in Figure 2-3. The lithology at these sites consists of an approximately 5- to 10-foot thick silty fill unit overlying a less permeable silt or clay unit (the Holocene Bay Mud). The Holocene Bay Mud unit ranges from approximately 25 feet thick (Site 15) to 50 feet thick (Site 7A), and is underlain by a dense sand, presumably the Merritt Sand. The bottom of the Merritt Sand was not encountered at these sites using CPT due to constraints caused by the sand density.

2.3 GROUNDWATER FLOW FINDINGS

This section presents the interpreted horizontal groundwater flow and vertical groundwater gradient directions based on groundwater level measurements obtained on January 5, 1995 (the depth-to-groundwater measurements are presented in Attachment F). The gradients are representative of one quarter of groundwater level measurements. The remaining three quarters of groundwater measurements will support a more thorough evaluation of groundwater gradients during the RI. The measurements obtained from each well represent the distance from the top of the well casing to the top of the water table. The depth-to-water measurements were combined with elevation survey data to determine the elevation of the top of groundwater in each well.

As determined in earlier tidal studies conducted at Sites 1, 2, and the Runway Area, groundwater levels in the first and second water-bearing zone wells at Sites 1, 2, and the Runway Area are affected by tidal changes and will fluctuate with the tide, altering the groundwater flow direction and vertical gradients with time. The results of this tidal study can be found in the Background Data Summary Report (PRC and JMM 1992a). Tidal corrections were not made for this data transmittal memorandum; a full evaluation of tidal influence at Sites 1, 2, and the Runway Area will be conducted during the RI. A tidal study has not been conducted on the second water-bearing zone wells east of the Runway Area; therefore, the effect of tidal influence on these wells is unknown.

Horizontal Gradient

Groundwater elevation contours are lines of equal groundwater elevation. Lateral or horizontal groundwater flow is from higher to lower groundwater elevations. Groundwater elevation contours for the first water-bearing wells were interpolated between monitoring wells that were installed in the first water-bearing wells, and groundwater contours for the second water-bearing wells (or deep zone) were interpolated between wells installed in the second water-bearing wells (or deep zone). The first water-bearing zone wells at Sites 1, 2, and the Runway Area are subdivided into A-zone wells (top of the first water-bearing zone) and E-zone wells (bottom of the first water-bearing zone). Figure 2-4 illustrates the groundwater elevation contours for the A-zone wells at Sites 1, 2, and the Runway Area, and the first water-bearing wells zone east of the Runway Area. Groundwater flow directions in the first water-bearing zone appear to be locally influenced by underground utilities. Because of the abundance of underground utility trench pathways and lack of groundwater elevation data between Sites 3, 6, and 7A, groundwater contours for the first water-bearing zone were not interpolated between these sites. The E-zone wells were not contoured because there are too few monitoring wells to provide adequate spatial distribution. Elevations for the E-zone wells are posted on Figure 2-5. The second water-bearing zone at Sites 1, 2, and the Runway Area is divided into "B-zone" and "C-zone" wells, representing the top and bottom of the second water-bearing zone, respectively. Deep wells east of the Runway Area are referred to as "D-wells." Groundwater contours for the second water-bearing zone (utilizing B-zone, C-zone, and D-wells) are presented on Figure 2-6. A schematic diagram indicating the well placement in various zones beneath Sites 1, 2, and the Runway Area is shown on Figure 2-7.

Vertical Gradient

Vertical groundwater gradients were determined based on the difference in groundwater elevations between a well installed in the first water-bearing zone and an adjacent well installed in the second water-bearing zone. Vertical gradient (i_v) has the following relationship:

$$\text{Vertical gradient } (i_v) = dh/dl$$

where:

dh = the difference in groundwater elevation between the shallow well (or first water-bearing zone well) and adjacent deep well (or second water-bearing zone well); and

dl = the difference between the midpoints of the screened section of the shallow well and adjacent deep well.

For example, a net downward groundwater flow component would exist in two adjacent wells if the groundwater elevation in the second water-bearing zone well was lower than the groundwater elevation in the first water-bearing zone well and a net upward gradient would exist if the groundwater elevation in the second water-bearing zone well was higher than the first water-bearing zone well. Vertical gradients are shown on Table 2-1. In the southeast portion of the base (Sites 7B and 11, 7C, 10B, 13, 16, and 19), where there is no definable Bay Mud unit, a difference in elevation between the two wells would suggest a gradient within the same water-bearing zone rather than two water-bearing zones which are separated by an aquitard.

2.3.1 First Water-Bearing Zone

Figure 2-4 shows groundwater contours for the first water-bearing zone A-zone wells at Sites 1, 2, and the Runway Area, and for the first water-bearing shallow wells east of the Runway Area. Figure 2-5 posts groundwater elevations for first water-bearing E-zone wells. The E-zone wells are not contoured because the spatial distribution and quantity of the wells does not provide sufficient data coverage for the generation of meaningful contours. Tidal corrections were not made in any of the wells. Based on the first quarter water level measurements, shallow groundwater at the southeast portion of the base (Sites 3, 7B and 11, 7C, 9, 13, 16, and 19) appears locally affected by subsurface utilities that are either leaking into the groundwater and creating a local groundwater mound (as seen at Site 3 in monitoring well MW97-3, and at Site 13 in MW-1), or allowing groundwater to flow into either a cracked underground pipe and/or more permeable trench backfill material thereby creating a local groundwater depression (as seen at Site 7B and 11 in monitoring well M11-01, and at Site 10B in monitoring well M10B-01). A northeast/southwest-trending groundwater trough is present in the central part of Site 7A. Shallow groundwater in the northern part of 7A flows southeastward into this trough, while A-zone groundwater in the eastern part of Site 7A flows northwestward into the trough.

Groundwater at Sites 1, 2, and the Runway Area generally flows concentrically from the center of the Runway Area toward the water bodies located to the north (Oakland Inner Harbor), west, and south (San Francisco Bay) of the Runway Area.

Vertical gradients were calculated at seven CTO 280 sites and are presented in Table 2-1. Downward vertical gradients were measured at Sites 7C, 9, 10B, 13, and 19, and at two of three locations at Site 7A. An upward vertical gradient was measured at Site 3, and at one location at Site 7A.

2.3.2 Second Water-Bearing Zone

Groundwater contours for the second water-bearing zone are shown on Figure 2-6. Groundwater flow direction on the eastern side of the base was determined using second water-bearing zone wells from CTO 280 Sites 3, 7A, 9, and 11, from deep wells at Sites 13 and 19, and from second water-bearing zone wells at non-CTO 280 sites (5, 10A, and 12). Four non-CTO 280 sites (Sites 4, 5, 8 and 10A) were utilized in order to provide a comprehensive groundwater gradient map. Groundwater in the second water-bearing zone generally flows to the west toward the Seaplane Lagoon east of Site 6, except at Site 4 where the groundwater flows to the northwest. Groundwater between Sites 5 and 6 generally flows to the southwest toward the Seaplane Lagoon, though groundwater flow south of Site 10A is to the north. At Site 5 a groundwater depression is evident in the vicinity of D05-02. Tidal corrections were not made in any of the wells.

Vertical gradients were calculated at seven CTO 280 sites and are presented in Table 2-1.

SECTION 3.0

3.0 OVERVIEW OF FOLLOW-ON FIELD PROGRAM CONDUCTED UNDER CTO 280

The follow-on field activities for the 15 CTO 280 sites were conducted in accordance with the Phase 2A FSP (PRC and Montgomery Watson 1994a), Phases 2B and 3 FSP (PRC and Montgomery Watson 1994b), Phases 5 and 6 FSP (PRC and Montgomery Watson 1994c), and the QAPP (PRC and Montgomery Watson 1993c). The field activities conducted under CTO 280 provided additional lithologic, chemical, and hydrogeologic information, and supported the RI/FS assessment of the nature and extent of soil and groundwater contamination. Field activities that were performed under this CTO include CPT, HydroPunch sampling, surface soil sampling, shallow soil boring and monitoring well installation, deep monitoring well installation, NPS sampling, geophysical and land surveying, a drain line video survey, quarterly groundwater sampling (including depth-to-groundwater measurements), and GeoProbe sampling.

Section 3 provides a general description of each of the field procedures conducted under CTO 280, and a listing of chemical analyses performed on each soil and groundwater sample. Variations from either the Phase 2A, Phases 2B and 3, or Phases 5 and 6 field sampling plans are documented in Table 3-1. Site-specific information, including a brief discussion about sampling locations and analytical results, is discussed in Sections 5 through 18.

3.1 CPT/HYDROPUNCH INVESTIGATION

The CPT/HydroPunch program consisted of CPT advancement combined with HydroPunch groundwater sampling at selected locations. The CPT program objective was to obtain supplemental lithologic information and to evaluate the depth and thickness of the second water-bearing zone for the purpose of selecting HydroPunch sample depths. Because previous investigations typically did not extend beyond 15 feet below ground surface (bgs), the primary objective of the HydroPunch sampling was to obtain grab groundwater samples at discrete locations in the second water-bearing zone for an evaluation of groundwater quality. The data were used to evaluate the necessity of deep groundwater monitoring wells. At several sites, HydroPunch groundwater samples were obtained from the first water-bearing zone to assist in locating shallow monitoring wells.

CPT consists of an electro-mechanical cone that is hydraulically pushed vertically through the soil at a constant rate while physical parameters are electronically recorded. The parameters include penetration resistance as measured at the cone tip, friction as measured on a friction sleeve, and pore pressure as measured directly behind the cone tip. A continuous profile of these three parameters with depth provides a qualitative interpretation of soil lithology.

The HydroPunch sampler consists of a 3.5-foot disposable polyvinyl chloride (PVC) screen and stainless steel drive tip which is advanced by direct push using the CPT vehicle and CPT rods. The screened segment is encased in the rods during advancement. When the final depth is attained, the rods are partially retracted to expose the PVC screen. Groundwater is collected with a 3-foot long, 1/2-inch diameter PVC bailer. After collection of the groundwater sample, the disposable PVC screen and stainless steel drive tip are left in the ground and the drill rods are removed. During the CTO 280 field program, the holes were grouted simultaneously as the rods were removed.

The CTO 280 CPT/HydroPunch program was conducted from June 27, 1994 to September 12, 1994 at all of the CTO 280 IRP sites, as well as at Sites 4 and 5. A total of 100 CPTs were pushed and 124 HydroPunch groundwater samples were collected. A single CPT was sufficient for multiple HydroPunch samples in some cases where the HydroPunch locations were close enough to the CPT. HydroPunch samples were collected approximately 5 feet from the CPT locations. CPT depths ranged from 16 to 134 feet bgs. HydroPunch samples ranged from 6 to 60 feet bgs. The full thickness of the second water-bearing zone could not be determined with the CPT as the high density of the Merritt Sand combined with the unsupportive overlying Holocene Bay Mud prevented complete advancement of the CPT rods to the bottom of the second water-bearing zone. In general, penetration into the second water-bearing zone by the CPT ranged from 5 to 15 feet. Because the larger diameter HydroPunch tool increased the penetration resistance into the sands, the HydroPunch tool was typically advanced about 5 feet into the second water-bearing zone. Physical parametric data was recorded and the lithology interpreted approximately every 0.8 feet during the CPT advancement.

Piezometers were installed in some of the HydroPunch locations to monitor groundwater elevations. Piezometer installation involved placing a 1/2-inch PVC screen and riser in the hole left by the HydroPunch sample. Piezometers were installed with sand in the annular space around the well

screen and a bentonite seal overlying the sandpack. Grout and/or a cement seal was installed in the annular space between the bentonite seal and the ground surface.

CPT and HydroPunch locations are shown on Figures 3-1 and 3-2, respectively. Field variances encountered during the program are listed in Table 3-1. A summary of CPT and HydroPunch activities conducted under CTO 280 is shown in Table 3-2. Chemical analyses that were performed on each HydroPunch groundwater sample are shown on Table 3-3. CPT lithologic printouts are included as Attachment G.

3.2 SURFACE SOIL SAMPLING

The objective of the surface soil sampling program was to further assess the extent of chemicals of interest in surface soils. Surface soil samples were collected with a small stainless-steel trowel which was decontaminated between each sample collection with Liquinox wash and a triple deionized (DI) water rinse. The samples were collected between 0 and 0.5 feet and placed in 4-ounce wide-mouth glass sample jars.

A total of 69 surface soil samples were collected from Sites 1, 2, Runway Area, 7A, 15, and 16 between July 12, 1994 and August 22, 1994. Additional surface soil samples were obtained from Site 1 for radionuclide analysis on February 9, 1995.

Surface soil sampling locations are shown on Figure 3-3. Variances from the FSP are documented in Table 3-1. A listing of chemical analyses performed on each surface soil sample is found in Table 3-4.

3.3 SHALLOW SOIL BORING AND SHALLOW MONITORING WELL INSTALLATION

The objective of the shallow soil boring and monitoring well installation program was to obtain additional chemical and lithologic soil data in the vadose zone and groundwater quality data in the first water-bearing zone. A total of 39 shallow soil borings were advanced under CTO 280 and 41 shallow monitoring wells were installed between August 10, 1994 and December 9, 1994. Shallow

soil boring and monitoring well installation was conducted at each of the CTO 280 IRP sites, except Site 15.

Hollow-stem auger (HSA) drilling methods were used to advance shallow soil borings and install shallow monitoring wells. Soil borings were typically advanced to a depth of 5.0 feet bgs and soil samples were collected at the surface, 2.5, and 5 feet bgs for lithologic logging and chemical analysis. Soil samples were collected using a 2-inch diameter split-spoon sampler. Upon retrieval, soil samples were screened for VOCs in the field using a photoionization detector (PID). The PID readings were recorded on each boring log. The shallow wells were installed using 2-inch, Schedule 40, PVC riser, 0.010-inch slot screen, and number 2/12 Monterey sand. Monitoring wells were installed after completion of some soil borings while the auger flights remained in the ground to stabilize the bore hole.

The first water-bearing zone at Sites 1 and 2 and the Runway Area was further subdivided into an upper (A-zone) zone and lower (E-zone) zone. The shallow wells and A-zone wells were typically screened from approximately 2 to 3 feet above the groundwater table to an average of 7 feet below the groundwater table to allow for sampling of the upper portion of the first water-bearing zone. The tops of screens for the A-zone wells varied from 2 to 5.5 feet bgs and bottom of screen varied from 9.75 to 15.5 feet bgs. The tops of screens for the E-zone wells at Sites 1, 2, and the Runway Area varied from 6 to 11.25 feet bgs and bottom of screen varied from 12 to 21.25 feet bgs, spanning the lower portion of the first water-bearing zone.

Shallow soil boring and shallow monitoring well locations are shown on Figures 3-1 and 3-2, respectively. Variances from the FSP are documented in Table 3-1. Chemical analyses performed on shallow soil boring samples are shown on Table 3-5, chemical analyses performed on all groundwater samples are shown on Table 3-6, and shallow groundwater monitoring well construction details are shown on Table 3-7. Boring logs and shallow well construction diagrams are included as Attachment H.

3.4

DEEP WELL INSTALLATION

A total of 19 deep wells were installed under CTO 280 to monitor water quality in the second water-bearing zone, at locations shown on Figure 3-2. Fourteen of the deep wells were installed approximately midway into the second water-bearing zone (or deep zone at Sites 7C, 10B, 13, and 19) and five wells (at Sites 1, 2, and the Runway Area) were installed at the bottom of the second water-bearing zone. The deep wells were installed between October 12, 1994 and November 30, 1994 at Sites 1, 2, Runway Area, 3, 7A, 7B and 11, 7C, 9, 10B, 13, and 19. The location of the deep wells was based on the analytical results of the HydroPunch groundwater samples after approval by the DTSC and Regional Water Quality Control Board (RWQCB).

Deep wells were installed using mud-rotary drilling techniques; conductor casing was installed in the Holocene Bay Mud using HSA drilling techniques. The deep wells were installed using 3-inch, Schedule 40, PVC riser, 0.010-inch slot screen, and number 2/12 Monterey sand. Locations and screening intervals of these deep wells were selected based on HydroPunch groundwater quality data, as well as consideration for adequate spatial distribution for groundwater gradient evaluation. Where feasible, wells were installed adjacent to shallow monitoring wells to assess vertical groundwater gradient.

Field variations from the sampling plan are shown on Table 3-1, chemical analyses that were performed on each deep groundwater sample are shown on Table 3-6, and deep monitoring well construction details are shown on Table 3-8. Boring logs and monitoring well construction logs are included as Attachment H.

3.5

NON-POINT SOURCE SAMPLING

A total of 24 NPS sediment samples were obtained from July 18, 1994 to November 30, 1994 from Sites 3, 6, 7A, 7B and 11, 7C, 9, 10B, 13, 16, and 19, at locations shown on Figure 3-3. The NPS sediment samples were collected from storm sewer catch basins to assess the potential for these utilities to act as conduits for transporting chemicals off site. A stainless steel spoon attached to an extended handle was used to obtain the sediment samples. Sediment samples were collected from the

bottom of the storm sewers. Most of the locations had a maximum of 2 inches of sediment deposited on the bottom of the catch basins.

Field variations from the sampling plan are shown on Table 3-1. Table 3-9 lists the chemical analyses performed on each NPS sample.

3.6 WELL DEVELOPMENT AND GROUNDWATER MEASUREMENT AND SAMPLING

A total of four quarterly groundwater elevation measurement and sampling events are scheduled for the shallow and deep wells at each of the CTO 280 IRP sites between 1994 and 1995. The analytical results of the first quarter groundwater sampling event, which occurred during September and October 1994, are discussed in Sections 5 through 18 of this data transmittal memorandum. The analytical results of the final three quarterly groundwater sampling events will be presented in the RI reports. The second quarter groundwater elevation data were used to generate groundwater contours because not all wells were installed in the first quarter. The second quarter groundwater sampling event occurred during January 1995.

3.6.1 Well Development

All newly installed monitoring wells were developed as soon as possible, but no sooner than 48 hours following installation. Wells were surged, and at least three times the standing well volume, including the volume of the sand filter pack, was purged. During the purging process, the specific conductance, pH, turbidity, and water temperature were periodically measured. Details of well development are included in the Phase 2A, Phases 2B and 3, and Phases 5 and 6 FSPs. Variations from the FSPs are shown on Table 3-1.

3.6.2 Groundwater Sampling

All wells were sampled no sooner than 2 days after development. Prior to sampling, a water level measurement was obtained using an electronic water-level meter. The water level was used to evaluate groundwater gradient and to calculate the volume of the standing water in a given well.

Field equipment and procedures utilized for the deep monitoring well installation program are discussed in the Phase 2A, Phases 2B and 3, and Phases 5 and 6 FSPs. Variances from the FSPs are shown on Table 3-1. Depth to groundwater measurements are included as Attachment F.

3.7 GEOPHYSICAL SURVEY

The objective of the geophysical survey program was to determine the location of suspected underground tanks at Sites 7B and 11, and 7C. The survey was conducted between July 19, 1994 and October 17, 1994.

Geophysical survey equipment used included a ground penetrating radar unit (GPR), magnetic (MAG), and electromagnetic (EM) equipment. GPR is useful for locating buried objects or areas of disturbed soils that may represent underground storage tanks and/or pipe lines, and the MAG survey is useful in detecting iron-rich objects such as metallic underground storage tanks. Attachment I includes a detailed description of these techniques and results of the survey.

3.8 VIDEO SURVEY

The objective of the video survey program was to verify the integrity of drain lines in Building 410 at Site 9. The drain lines at Building 410 have been used to transport methylene chloride waste fluids from paint stripping operations. Cracks and/or corrosion of the lines may have acted as conduits for introducing contaminants to the soil and groundwater.

The video inspection survey of the floor drain lines was conducted prior to the field investigation, between July 19 and August 12, 1994. Several of the drain lines had debris blockages that prevented a complete video survey. The drain lines that were surveyed appeared intact. Thus, HydroPunch samples were located near areas of the drain lines that were not surveyed due to blockage by debris.

3.9 LAND SURVEYING

The objective of the land surveying program was to accurately locate and map sample location points and determine the top of casing elevations of the groundwater monitoring wells. The survey included

measuring the location and elevation of surface soil samples, soil borings; groundwater monitoring wells, CPT locations, HydroPunch sample locations, and NPS locations.

The work was performed by a surveyor licensed by the State of California using the California State Plane Coordinate System. Elevations were surveyed relative to the 1929 USGS mean low low water (MLLW) datum. The surveyed point on the monitoring well casing was clearly marked. Soil borings, surface soil samples, CPT, and HydroPunch samples were surveyed with a horizontal accuracy of approximately 1.0 feet and vertical accuracy of approximately 0.10 feet. Monitoring well casings were surveyed with a horizontal accuracy of 0.10 feet and vertical accuracy of 0.01 feet.

Field equipment and procedures utilized for the land survey program are discussed in the Phase 2A, Phases 2B and 3, and Phases 5 and 6 FSPs.

3.10 GEOPROBE INVESTIGATION

The objective of the GeoProbe investigation was to obtain additional soil data in the vadose zone and groundwater quality data in the first water-bearing zone at Sites 3, 5, 13, and 16. The GeoProbe data were used to help determine the locations of soil borings and groundwater monitoring wells at these sites. A description of GeoProbe field procedures, sampling locations, and analytical results are included as Attachment J.

3.11 CTO 280 WORK CONDUCTED AT SITES 4, 5, AND 10A

Field work was conducted at Sites 4, 5, and 10A to further assess potential chemicals of interest in the soil and groundwater. The supplemental field work included:

Site 4

- Three shallow soil borings
- One CPT

Site 5

- Two shallow monitoring wells
- Three piezometers

- Four CPTs
- Four deep HydroPunch
- Two shallow HydroPunch
- Five shallow GeoProbe

Site 10A

- Two piezometers
- One CPT
- Two shallow HydroPunch

Results of the supplemental work conducted at these sites are presented in Attachment A. Additionally, Attachment A includes maps of Sites 4 and 5 showing concentration contours of chlorinated organic compounds in groundwater samples collected during the July/August and September/October 1994 sampling events.

The field work conducted at these sites was supplemental to earlier follow-on work conducted at the sites during the winter and spring of 1994 (as part of CTO 260). The recent work, which is discussed in this data transmittal memorandum, was performed to fill minor CTO 260 data gaps from the initial follow-on work.

SECTION 4.0

4.0 DATA QUALITY

The analytical program, data validation process, and data quality objectives (DQO) for the first quarterly groundwater samples, HydroPunch samples, and soil samples are established in the Phase 2A FSP (PRC and Montgomery Watson 1994a), Phases 2B and 3 FSP (PRC and Montgomery Watson 1994b), Phases 5 and 6 FSP (PRC and Montgomery Watson 1994c), and Section 3.0 of the RI/FS work plan addendum (PRC and Montgomery Watson 1993c). The DQOs and the quality control (QC) program described in these documents provided the structure by which the chemical data results were reviewed. The data were evaluated with respect to the following five criteria: precision, accuracy, representativeness, completeness, and comparability (the PARCC criteria). This section is a summary of the data quality and is not intended as a quality control summary report. Details of the data validation and quality will be presented in quality control summary reports to be included in the RI reports. Section 4.1 summarizes the analytical program, Section 4.2 summarizes the data validation process, and Section 4.3 discusses the results of the PARCC criteria for the first quarterly groundwater samples, HydroPunch samples, and soil samples for the 15 IRP Sites covered under CTO 280.

4.1 ANALYTICAL PROGRAM

The analytical methods are outlined in Section 3.6 of the RI/FS work plan addendum (PRC and Montgomery Watson 1993c), and are described below:

- VOCs were analyzed by EPA contract laboratory program (CLP) special analytical services (SAS) volatile organic analysis (VOA) method (water and soil samples).
- SVOCs were analyzed by EPA CLP routine analytical services (RAS) semivolatile organic analysis (SVOA) method (water and soil samples).
- Organochlorine (OC) pesticides/PCBs were analyzed by CLP RAS PCBs/pesticides (PEST) method (water and soil samples).
- Polychlorinated dibenzo-p-dioxins and dibenzofurans were analyzed according to the CLP SAS Method B requirements for the 1989 EPA Method 8280 (soil samples).
- Total petroleum hydrocarbons-purgeable (TPH-P) was analyzed according to the California Leaking Underground Fuel Tank (LUFT) Manual (State Water Resources Control Board [SWRCB] 1989)-modified EPA Method 8015 (water and soil samples).

- Total petroleum hydrocarbons-extractable (TPH-E) was analyzed according to LUFT-modified EPA Method 8015 (water and soil samples).
- Metals and cyanide were analyzed by EPA CLP metals and cyanide (METALS) method (water and soil).
- General chemical parameters (acidity, alkalinity, conductivity, chemical oxygen demand [COD], hardness, pH, total sulfide, TDS, oil and grease, total organic carbon [TOC]), and major anions (chloride, fluoride, sulfate, nitrate, and nitrate) for water samples were analyzed by various methods. TOC, pH, and major anions were analyzed by various methods for soil samples.
- Radionuclides were analyzed by EPA 900.0 for gross alpha and gross beta and by EPA 9040 for Radium 226 and 228.

All analytical work was performed by Quanterra of Santa Ana, California, with the exception of radionuclides. Radionuclide testing was performed by Quanterra of St. Louis, Missouri.

4.2 DATA VALIDATION

Data validation was performed by PRC, QuataLex, Inc., and ICF Kaiser. The quality of the sample data was evaluated based on field QC samples, laboratory QC samples, and method-specific QC parameters. Field QC samples consisted of field blank samples (source water), equipment rinsate blank samples (from decontamination activities), trip blank samples, and field duplicate samples. Laboratory QC samples included method blank samples, laboratory control samples (LCS), matrix spike/matrix spike duplicate samples (MS/MSD), and laboratory matrix duplicate samples. Method-specific QC parameters included analyte holding times, initial and continuing calibrations, post-digestion and method of standard addition (MSA) spike recoveries (metals), and internal and surrogate standard recoveries (organics), and other related QC parameters. As specified in the RI/FS work plan addendum, all data received cursory review (EPA Level III). In addition, 10 percent of the data were selected randomly for full validation (EPA Level IV). A detailed description of the procedures used for data validation are provided in the RI/FS work plan addendum. The following data qualifiers were used by the validators to qualify the reported detection limits and analyte concentrations. The definitions for these qualifiers are consistent with "National Functional Guidelines for Organic Data Review" (EPA 1990) and "Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses" (EPA 1988).

- No Qualifier - Indicates that the reported concentration is acceptable both qualitatively and quantitatively.
- U - Indicates compound was analyzed for but not detected above the concentration listed.
- J - Indicates an estimated concentration value. The result is considered qualitatively acceptable, but quantitatively unreliable.
- UJ - Indicates an estimated quantitation limit. The compound was analyzed for but was considered nondetected.
- R - Rejected. The data are unusable (analyte may or may not be present). Resampling and reanalysis is necessary for verification.
- N - Indicates presumptive evidence of the presence of this analyte.

Eight qualifier comment codes were used to indicate the type of QC problem leading to the qualification of the data and are summarized below:

- a - Surrogate recovery outside specified control limits
- b - Contamination found in method blank or field blank samples
- c - Matrix spike recovery outside specified control limits
- d - Duplicate relative percent difference (RPD) for laboratory matrix duplicate, field duplicate, or MS/MSD outside specified control limits
- e - Internal standard recovery outside specified control limit
- f - Calibration criteria were not met
- g - Reported concentration is below the CRQL or the CRDL
- h - All other qualifications (that is, exceeded holding times, serial dilution precision, and postdigestion spikes)

The percentages of the data that were qualified using the above qualifiers and comment codes are summarized in Table 4-1 for water samples and in Table 4-2 for soil samples.

4.3 PARCC

Through the data validation process, the data were evaluated for acceptable quality and quantity, based on the critical indicator parameters of PARCC criteria. Objectives for these indicator parameters were developed for this project based on past experience and in the objectives of the RI/FS work plan addendum and the Phases 2B and 3 FSP. Field procedures, analytical methods, and the project quality assurance/quality control (QA/QC) program were selected and developed to meet these objectives. The definitions for each PARCC criteria are presented in Section 3 of the RI/FS work plan addendum, and are discussed briefly below.

4.3.1 Precision

Precision refers to the reproducibility of measurements of the same characteristics, usually under a given set of conditions. Precision is expressed as the RPD of a duplicate pair. During the process of data validation, all field duplicate samples, matrix spike duplicate pairs, and laboratory matrix duplicate pairs were evaluated for compliance with the acceptance criteria for precision for each analytical method. Although field duplicate precision data was evaluated in each data validation report, no qualifications were made on the basis of field duplicate precision alone.

4.3.2 Accuracy

Accuracy refers to the degree in which a measured value agrees with the true value. Errors introduced into the measurement system through sample matrix effects, sample preparation, laboratory contamination, and poor analytical techniques can have an impact on accuracy. The accuracy of each analytical result was evaluated through the analysis of initial and continuing calibrations, matrix spike samples, laboratory control samples, post-digestion and MSA recoveries, internal and surrogate recoveries, and method blanks.

4.3.3 Representativeness

Representativeness is a qualitative expression of the degree to which sample data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or an

environmental condition. Sample results were evaluated for representativeness by examining items related to the collection of samples, such as the adherence to specified sampling locations and sample quantities, sampling techniques and sample handling procedures, and the chain-of-custody documentation. Also examined were laboratory procedures, including adherence to specified analytical methodologies, holding time constraints, and reported quantitation limits. Any parameters that adversely affected the representativeness of a sample result are documented in the validation reports.

Field blank, equipment rinsate blank, trip blank, and method blank results were evaluated during the data validation process to determine whether field conditions, decontamination procedures, travel conditions, or laboratory conditions may have affected the sample results.

4.3.4 Completeness

Completeness is defined as the percentage of measurements that are judged to be valid compared to the entirety of the data needed for the project. The project completeness was calculated by dividing the number of complete, valid sample results (those not qualified as rejected), by the total number of samples planned for analysis. The completeness goal of 90 percent, as stipulated in the RI/FS work plan addendum, was met for this part of the project. For the water samples, the following data were valid:

<u>Parameter</u>	<u>Percent</u>
Alkalinity	99.6
Anions	99.7
COD	97.0
Conductivity	99.6
Hardness	99.6
OC pesticides/PCBs	98.8
pH	99.6
Radionuclides	90.7
Total dissolved solids	99.6
SVOCs	99.8
Metals	99.5
TOC	99.6
VOCs	95.5

All other water parameters were 100 percent valid. For the soil samples, 99.8, 99.9, and 99.5 percent of the data for SVOCs, metals, and VOCs, respectively, and 100 percent for all other parameters were valid. Therefore, all parameters met the DQO of 90 percent.

4.3.5 Comparability

Comparability of the data is a qualitative expression of the confidence with which one data set may be compared to another. Comparability of the data was achieved by the use of standard methods of analysis, quantitation limits, and the standardized data validation procedures. Soil results for all analytical methods were reported in dry weight units (adjusted for moisture content). Quantitation limits within a method varied slightly from sample to sample due to the adjustments for moisture content.

Soil and water quantitation limits for several analytes in methods for SVOC, VOC, and metals were lowered due to a request from the Department of Toxic Substances Control (DTSC) and the RWQCB. Quantitation limits for all other analytes reported by the laboratory were those defined by Section 3 of the RI/FS work plan addendum. Quanterra was unable to meet the CRDL for mercury of 0.0036 milligrams per kilogram (mg/kg) for soil and 0.025 micrograms per liter ($\mu\text{g/L}$) for water. The instrument detection limits (IDL) reported by the laboratories for mercury in soil and water are 0.05 mg/kg and 0.1 $\mu\text{g/L}$, respectively.

All elevated reporting limits were assessed during the data validation process to determine if there was a justifiable reason for the raised limits. Reporting limits were frequently raised due to high concentrations of target or interfering compounds. In these cases, sample extracts are diluted and analyzed, or a smaller aliquot of original sample is analyzed, resulting in some non-detected target analytes being reported at higher than normal detection limits. Through the data validation process, the reporting limits for these samples were judged to be acceptable.

SECTION 5.0

5.0 SITE 1 - 1943-1956 DISPOSAL AREA

The following subsections briefly discuss the site history, previous investigations, findings from previous investigations and the current CTO 280 follow-on investigation, and a summary of data completeness. A detailed description of Site 1, the hydrogeologic setting, and past and current activities are presented in the Phases 5 and 6 SWAT and DSR (PRC and Montgomery Watson 1993a), the Phases 1 and 2A DSR (PRC and Montgomery Watson 1993b), the DSR for the background and tidal influence studies and additional work at Sites 4 and 5 (PRC and JMM 1992a), and the Phases 5 and 6 follow-on FSP (PRC and Montgomery Watson 1994c).

5.1 SITE DESCRIPTION

Site 1 is located in the northwestern corner of NAS Alameda as shown on Figure 2-2. Based on aerial photographs, an area of approximately 12 acres served as a landfill for the base from 1943 to 1956 (the IR boundary for Site 1 encloses a 120-acre area). The landfill reportedly received all waste generated at NAS Alameda except liquid waste, which was discharged directly to the Seaplane Lagoon. Landfilled wastes reportedly included old aircraft engines, kitchen scraps and garbage from ships in port, cables, scrap metal, waste oil, waste paint, waste solvents, cleaning compounds, construction debris, and low-level radiological material.

The area occupied by Site 1 was developed through hydraulic filling conducted from 1942 to 1943. Prior to the hydraulic filling, the area was covered by waters of the San Francisco Bay. Waste disposal activities reportedly began in 1943. The disposal method consisted of digging trenches in the hydraulic fill to the water table, filling the trenches with waste, and compacting the material with a bulldozer. Cover material was applied on an irregular basis. Reportedly, combustion of waste drums often occurred during bulldozing operations, suggesting that flammable materials were disposed at the site.

Beginning in the early 1950s until 1954, the Navy Public Works Department conducted open burning of waste materials in a pit located in the extreme northwestern corner of Site 1 (northern end of Runway 13-31). Beginning in 1952, the construction of runways necessitated covering the northern portion of Site 1. By 1956, the entire disposal area was covered with hydraulic fill material.

Currently, most of Site 1 is paved and is part of active runways. Other portions of Site 1 are occupied by a skeet range, a target range, a picnic area, and a running path.

5.2 PREVIOUS INVESTIGATIONS

In 1984, Wahler Associates completed an investigation of Site 1 under the Naval Assessment and Control of Installation Pollutants (NACIP) program (Wahler Associates 1985). During the investigation, Wahler Associates installed five groundwater monitoring wells and collected one soil and one groundwater sample from each monitoring well.

As mandated by the RWQCB in 1987, an initial SWAT investigation was conducted at Site 1 by Canonie in 1990. Sixty-nine surface soil samples were collected as part of the first phase of the SWAT investigation. Canonie drilled two exploratory soil borings on the northern border of Site 1.

In 1991, as part of Phase II of the SWAT investigation, the PRC team installed 25 groundwater monitoring wells (20 in the first water-bearing zone and 5 in the second water-bearing zone), collected soil samples for chemical and geotechnical analyses, collected four quarters of groundwater samples, conducted surface geophysics, performed slug tests on each newly installed groundwater monitoring wells, and performed a tidal influence study.

5.3 FINDINGS FROM PREVIOUS INVESTIGATIONS

Monitoring well locations discussed in this section are shown on Figure 3-2. Soil borings conducted during previous investigations can be referenced in the Phases 5 and 6 SWAT and DSR.

Surface soil samples collected from across the site contained SVOCs, PCBs, pesticides, and TRPH; the highest concentrations were found in the northwestern corner of Site 1. Deeper soil has been impacted by chemicals at depths ranging from 0.5 to 25 feet bgs. PCBs have been found from 0 to 13 feet bgs on the northeast corner, and to a depth of 2.5 feet on the east side of the site.

Based on an investigation conducted by Wahler Associates (1985), elevated concentrations of heavy metals (copper, lead, and zinc) and organic compounds were found in soils near the western boundary

of Site 1. The metals do not appear to impact the groundwater, although elevated concentrations of organic compounds, including chlorinated solvents not detected in the soil samples, were found in the groundwater.

During the Canonic investigation, SVOCs, metals, pesticides and PCBs, and total recoverable petroleum hydrocarbons (TRPH) were detected in surface soil samples. The SVOCs, primarily PAHs, were detected in surface soil samples along the southern and western edges of the site. Six soil samples along the western and southern edges of the site contained concentrations of TRPH above 100 milligrams per kilogram (mg/kg). Pesticides and PCBs were detected in surface soil samples from areas west of Runway 13-31.

Localized groundwater in the first water-bearing zone wells along the western edge of the landfill appear to have been impacted by VOCs and SVOCs, whereas groundwater in the second water-bearing zone, or the western edge of the landfill, did not appear to contain elevated levels of organic compounds. 1,2-Dichloroethene and vinyl chloride were detected in the highest concentrations.

5.4 CTO 280 FOLLOW-ON INVESTIGATION

Field activities performed under CTO 280 at Site 1 included CPT, HydroPunch sampling, surface soil sampling, shallow soil boring and monitoring well installation, deep monitoring well installation, and quarterly groundwater sampling. Table 5-1 presents a summary of the field program. Figures 3-1 through 3-3 show sampling locations. Tables 3-2 through 3-9 summarize the field program and analyses performed on soil and groundwater samples.

Cone Penetrometer Testing

A total of 10 CPT locations (CPT-S01-01, CPT-S01-02, CPT-S01-04 through CPT-S01-08, and CPT-S01-10 through CPT-S01-12) were completed at Site 1 as shown on Figure 3-1. The objective of the CPT investigation at Site 1 was to provide sufficient information to determine if the first and second water-bearing zones are hydraulically connected beneath Site 1 and to assess the thickness of the second water-bearing zone.

HydroPunch Sampling

A total of 15 HydroPunch samples were collected from five locations in the first and second water-bearing zones at Site 1, at locations shown on Figure 3-2. HydroPunch samples collected from the top of the first water-bearing zone include HP1-2-A, HP1-5-A, HP1-8-A, HP1-10-A, and HP1-11-A. HydroPunch samples collected from the bottom of the first water-bearing zone include HP1-2-E, HP1-5-E, HP1-8-E, HP1-10-E, and HP1-11-E; and HydroPunch samples collected from a sand lense within the Holocene Bay Mud unit include HP1-2-D, HP1-5-D, HP1-8-D, HP1-10-D, and HP1-11-D. A listing of the chemical analyses performed on these samples is shown on Table 3-3.

Surface Soil Sampling

A total of 29 surface soil samples were obtained from Site 1 from locations shown on Figure 3-3. A listing of the chemical analyses performed on these samples is shown on Table 3-4.

Soil Sampling

A total of 39 soil samples were collected at Site 1 during the installation of the new monitoring wells (described below). Monitoring well locations are shown on Figure 3-2. A listing of the chemical analyses performed on these samples is shown on Table 3-5. Results of geotechnical analyses performed on select soil samples are included as Attachment K.

Shallow Monitoring Wells

A total of nine shallow monitoring wells (M032-A, M033-A, M034-A, M035-A, M003-E, M030-A, M030-E, M031-A, and M031-A) were installed in the first water-bearing zone at Site 1, at locations shown on Figure 3-2. Shallow monitoring well construction details are shown on Table 3-7.

Deep Monitoring Wells

A total of four deep monitoring wells (M028-C, M003-B, M030-C, and M031-C) were installed in the second water-bearing zone at Site 1 at locations shown on Figure 3-2. Deep monitoring well construction details are shown on Table 3-8.

Groundwater Sampling

Groundwater monitoring well and HydroPunch locations are shown on Figure 3-2. A total of four quarterly groundwater sampling events are scheduled for monitoring wells at Site 1, except where noted on Table 5-1. The fourth quarter of groundwater sampling for CTO 280 sites is scheduled for completion in August 1995.

In the first quarter of CTO 280, groundwater samples were collected from existing and newly installed wells at Site 1 for a total of 18 A-zone and 10 E-zone monitoring wells in the first water-bearing zone. Five HydroPunch samples were collected from the A- and E-zones in the first water-bearing zone. Deep groundwater samples were collected from six C-zone and two B-zone monitoring wells. In addition, groundwater samples were collected from five HydroPunch locations in the second water-bearing zone. Listings of HydroPunch analyses and first quarter groundwater sampling analyses are shown on Tables 3-3 and 3-6, respectively.

5.5 CTO 280 FOLLOW-ON INVESTIGATION ANALYTICAL RESULTS

Tables 5-2 through 5-5 summarize results of chemical analyses performed on soil and first quarter groundwater samples collected at Site 3. Quality control information related to these samples is shown on Table 5-6. A brief discussion of the results of chemical analyses are presented below. A complete listing of analytical results is presented as Attachment B (limited distribution).

Surface Soil

- Analytical results for organic chemical analyses performed on surface soil samples are shown on Table 5-2; locations are shown on Figures 3-1 and 3-3.

- One VOC (1,2-DCE) was detected in the 5-foot sample collected from M028-C on the western boundary of Site 1.
- SVOCs, primarily PAHs, were detected in surface soil samples collected east and west of Runway 13-31, primarily along the western boundary of the site. Low levels of PAH class SVOCs were detected in soil samples collected from four of the 13 monitoring wells installed. The SVOCs were primarily detected in samples collected from borings on the western boundary of site (M028, M034, and M035).
- TPH-extractable (TPH-E) as motor oil was detected in 25 of the 29 surface soil samples collected from Site 1; the most elevated levels were detected in the Alpha Area (1 sample) and west of Runway 13-31 (2 samples). (Note: TPH is reported as TPHC in the laboratory report and attached analytical tables). TPH-E as motor oil and/or diesel were also detected in most of the soil samples collected from soil borings; TPH-E as JP-5 were detected in one sample collected from a soil boring west of Runway 13-31.
- One pesticide was detected in one of three surface soil samples collected from the Alpha Area, and one was detected in one surface soil sample collected from the Burn Area. Five surface soil samples collected west of Runway 13-31 contained pesticides and/or PCBs.
- Three metals exceeded 10 times the STLC value in 19 surface soil samples located throughout the site. Five metals exceeded 10 times the STLC value in 10 soil samples collected from borings. Lead was detected most frequently. Metals exceeding 10 times the STLC value are shown on Table 5-3.

Groundwater - First Water-Bearing Zone

- Analytical results for organic chemical analyses performed on groundwater samples are shown on Table 5-4; locations are shown in Figure 3-2.
- Solvent-related VOCs were detected in nine A-zone and four E-zone monitoring wells. They were most elevated in monitoring wells M002-A, M028-A, and M034-A at the west and north boundaries of Site 1.
- Figure 5-1 illustrates the distribution of 1,2-dichloroethene detected in the first quarter of groundwater samples from the first water-bearing zone.
- Petroleum hydrocarbon-related VOCs were detected in seven first water-bearing zone monitoring wells. The most elevated concentrations were detected in monitoring wells M028-A, M028-E, and M034-A, that are located on the western boundary of the site. Chloroform was detected in one sample collected from M035-A, and carbon disulfide was detected in 5 of the 10 HydroPunch samples collected from the first water-bearing zone.

- Four SVOCs were detected on the western boundary of the site in monitoring wells M001-A, M028-A, M028-E, and M034-A. The most elevated levels were in M028-A and M034-A.
- Metals exceeded the 95/95 STI in 14 of the groundwater samples collected from monitoring wells in the first water-bearing zone. Metals exceeding the 95/95 STI are shown on Table 5-5.
- TDS levels ranged from 186 milligrams per liter (mg/L) to 26,700 mg/L in the first water-bearing zone.

Groundwater - Second Water-Bearing Zone

- Analytical results for organic chemical analyses performed on groundwater samples are shown on Table 5-4; locations are shown on Figure 3-2.
- Three VOCs (including carbon disulfide, chloroform, and bromodichloromethane) were detected in five of the monitoring wells sampled. Carbon disulfide was also detected in two of the five HydroPunch samples.
- The SVOCs phenol and bis(2-ethylhexyl)phthalate were detected in M003-B and M007-C, respectively.
- TDS levels ranged from 1,410 mg/L to 28,100 mg/L.

5.6 SUMMARY OF SITE CHARACTERIZATION

Based on the review of the data, it is concluded that:

- The compounds that were detected in the soil and groundwater during this investigation are similar in concentration and nature to those found during previous investigations.
- The extent of potential chemicals of interest in the soil and groundwater appear to have been adequately characterized for the purpose of conducting an RI/FS. If a human health or environmental risk is defined during the risk assessment the need for additional investigation will be evaluated.

SECTION 6.0

6.0 SITE 2 - WEST BEACH LANDFILL

The following subsections briefly discuss the site history, previous investigations, findings from previous investigations and the current CTO 280 follow-on investigation, and a summary of data completeness. A detailed description of Site 2, the hydrogeologic setting, and past and current activities are presented in the Phases 5 and 6 SWAT and DSR (PRC and Montgomery Watson 1993a), and the Phases 5 and 6 follow-on FSP (PRC and Montgomery Watson 1994c).

6.1 SITE DESCRIPTION

Site 2, at locations shown on Figure 2-2, is referred to as the West Beach Landfill. Site 2 occupies approximately 110 acres in the southwestern corner of NAS Alameda and abuts the southern boundary of Site 1. The western and southern borders of Site 2 are on San Francisco Bay. In 1957, the completion of a seawall allowed the northern portion of the existing Site 2 to be filled with hydraulic fill to above sea level. By 1969, most of the southern portion had been filled, and by 1973, fill had been emplaced over the entire area that is now Site 2. The landfill is surrounded by an earthen berm approximately 55 feet wide and 7 feet high.

Disposal operations began at the West Beach Landfill in the early 1950s; full disposal operations began in 1956, following the closure of the 1943-1956 Disposal Area (Site 1), and continued until disposal ended in 1978. Waste was disposed by excavating a trench to approximately 20 feet bgs into the hydraulic fill, and placing waste in the trench. During the late 1970s, trenches were dug to the water table prior to placing waste. Wastes were compacted and covered with soil.

Wastes deposited in the West Beach Landfill included waste chemical drums, municipal garbage, solvents, oily waste and sludge, paint waste, plating wastes, industrial strippers and cleaners, acids, mercury, PCB-contaminated liquids, batteries, low-level radiological waste, scrap metal, inert ordnance, asbestos, pesticides (solid and liquid), tear gas agent (ortho-chlorobenzylidene malononitrile), infectious waste, creosote, dredge spoils, and waste medicines and reagents. An estimated 1.6 million tons of waste were disposed in the West Beach Landfill.

During the 1980s, a wetland area was accidentally created in the southwest corner of Site 2 by excavating hydraulically placed fill and dredge spoils down to the water table for use as landfill cover. The resulting wetland provides a nesting area for birds and is also well vegetated with grasses. Currently, the site is not used for air station operations or activities.

By June 1985, the Navy had installed a slurry wall along a portion of the western perimeter of the landfill to prevent seepage of leachate into the bay (HLA 1983).

6.2 PREVIOUS INVESTIGATIONS

In August 1978, Harding Lawson Associates (HLA) submitted a sanitary landfill site study (HLA, 1978) to the Department of Health Services (DHS) to close Site 2 as a Class II landfill facility. Groundwater samples were collected and analyzed during this study.

On October 19, 1983, HLA submitted the Confirmation Study (HLA 1983). In this study, groundwater samples collected from wells installed within the landfill by HLA were analyzed. The analytical results indicated the groundwater was not significantly impacted and HLA recommended that the site be closed as a Class II landfill.

On June 11, 1986, the Navy received a request from the RWQCB for a proposal to address the ponding of water at Site 2 (Canonie 1990). In November 1986, the Navy submitted a plan to the RWQCB for grading the site. The grading was completed in December 1986 (Canonie 1990).

On June 11, 1987, the Navy was notified by the RWQCB of the requirements to perform a SWAT at Site 2 (Canonie 1990). In early 1990, during the initial phase of the SWAT investigation, Canonie drilled four exploratory borings, one at each corner of the West Beach Landfill. The results of the Canonie investigation are presented in the Phases 1 and 2A DSR (PRC and Montgomery Watson 1993b).

In 1991, as part of completion of the SWAT investigation, the PRC team collected 150 surface soil samples (using a surveyed grid of approximately 200 by 200 feet). Twenty-three surface water

samples and twelve sediment samples were collected from the wetland located in the southwestern portion of the site, and 29 groundwater monitoring wells were installed around Site 2.

6.3 FINDINGS FROM PREVIOUS INVESTIGATIONS

Monitoring well locations discussed in this section are shown on Figure 3-2. Soil borings and surface soil sampling locations conducted during previous investigations can be referenced in the Phases 5 and 6 SWAT and DSR.

PCBs were found in most surface soil samples. The highest concentrations of PCBs were detected on the north, central, and east site areas. The concentrations of PCBs detected decreased to the south.

Pesticides were detected in the central and northern portions of the site, and concentrations were more elevated toward the north.

Total petroleum hydrocarbons and SVOCs were also found all across the site in the surface soil samples.

Organic compounds were detected at higher concentrations and more frequency in groundwater samples collected in the northwestern corner of Site 2.

6.4 CTO 280 FOLLOW-ON INVESTIGATION

Field activities performed under CTO 280 at Site 2 included CPT and HydroPunch sampling, surface soil sampling, shallow and deep monitoring well installation, and quarterly groundwater sampling. Table 6-1 presents a summary of the field program. Figures 3-1 through 3-3 show sampling locations. Tables 3-2 through 3-9 summarize the field program and analyses performed on soil and groundwater samples.

Cone Penetrometer

A total of seven CPT locations (CPT-S02-01 through CPT-S02-07) were driven at Site 2 at locations shown on Figure 3-1. The objective of the CPT investigation at Site 2 was to determine if the first and second water-bearing zones are hydraulically connected beneath the landfill and to assess the thickness of the second water-bearing zone.

HydroPunch Sampling

A total of 12 HydroPunch samples were collected at four locations from the Runway Area at locations shown on Figure 3-2. HydroPunch samples HP2-1-A, HP2-2-A, HP2-4-A, and HP2-5-A were collected from the top of the first water-bearing zone; HydroPunch samples HP2-1-E, HP2-2-E, HP2-4-E, and HP2-5-E were collected from the bottom of the first water-bearing zone; and HydroPunch samples HP2-1-D, HP2-2-D, HP2-4-D, and HP2-5-D were collected from a sand lense within the Holocene Bay Mud unit. A listing of chemical analyses performed on these samples is shown on Table 3-3.

Surface Soil Sampling

A total of seven surface soil samples (SS2-1 through SS2-7) were collected from Site 2, and are shown on Figure 3-3. A listing of the chemical analyses performed on these samples is shown on Table 3-4.

Soil Sampling

A total of 13 soil samples were collected at Site 2 during the installation of three monitoring wells (described below). Monitoring well locations are shown on Figure 3-2. Analyses conducted on soil samples are shown on Table 3-5. Results of the geotechnical analyses performed on select soil samples are included as Attachment K.

Shallow Monitoring Wells

One shallow monitoring well (M016-E) was installed in the first water-bearing zone at Site 2, at the location shown on Figure 3-2. Shallow monitoring well construction details are shown on Table 3-7.

Deep Monitoring Wells

A total of two deep monitoring wells (M016-B and M023-C) were installed in the second water-bearing zone at Site 2, at locations shown on Figure 3-2. Deep monitoring well construction details are shown on Table 3-8.

Groundwater Sampling

Groundwater monitoring wells at HydroPunch locations are shown on Figure 3-2. Groundwater samples from 11 wells in the shallow water-bearing zone (A- and E-zone wells) and the newly installed wells in the second water-bearing zone (M016-B and M023-C) are to be collected for four quarters. Groundwater samples are to be collected from the previously existing second water-bearing zone wells on a semiannual basis for 1 year. The fourth quarter of groundwater sampling for CTO 280 sites is scheduled for completion in August 1995.

For the first quarter of CTO 280, groundwater samples were collected from eight HydroPunch locations in the first water-bearing zone and four HydroPunch locations in the second water-bearing zone. A total of 10 groundwater samples were collected from monitoring wells in the first water-bearing zone, and 8 from the second water-bearing zone. A listing of HydroPunch analyses and first quarter groundwater sampling analyses are shown on Tables 3-3 and 3-6, respectively.

6.5 CTO 280 FOLLOW-ON INVESTIGATION ANALYTICAL RESULTS

Tables 6-2 through 6-5 present a summary of results of chemical analyses performed on soil and first quarter groundwater samples collected from Site 2. Quality control information related to these samples are shown on Table 6-6. A brief discussion of the results of chemical analyses are presented below. A complete listing of analytical results is presented as Attachment B (limited distribution).

Soil

- Analytical results for organic chemical analyses performed on soil samples are shown on Table 6-2; sample locations are shown on Figures 3-1 and 3-3.
- TPH-E as motor oil was detected in five of the seven surface soil samples from Site 2, and seven of nine shallow soil samples analyzed for TPH-E. Concentrations of TPH-E were highest in three soil samples obtained from M023-C.
- The VOC chlorobenzene was detected in the 5-foot sample from M023-C.
- Lead exceeded the 10 times STLC criteria in the surface sample from M023-C and from the 2.5-foot sample in M016-E.

Groundwater - First Water-Bearing Zone

- Analytical results for organic chemical analyses performed on groundwater samples are shown on Table 6-4; locations are shown on Figure 3-2.
- VOCs were detected in five groundwater samples obtained from first water-bearing zone monitoring wells. Petroleum and solvent-related VOCs were detected in M023-E. One or two VOCs were also detected in four of the wells.
- VOCs were detected in four HydroPunch samples. VOCs included 2-butanone and carbon disulfide. 2-Butanone is a common laboratory contaminant.
- SVOCs were detected in two wells on the northwest side of the base (M023-E and M024-A).
- Three metals exceeded the 95/95 STI in monitoring well M022-E.
- TDS values ranged from 3,480 mg/L to 28,000 mg/L.

Groundwater - Second Water-Bearing Zone

- Analytical results for organic chemical analyses performed on groundwater samples are shown on Table 6-4; locations are shown on Figure 3-2.
- VOCs were detected in three monitoring well samples obtained from the second water-bearing zone. The highest number of VOCs was detected in monitoring well M013-C.

- Carbon disulfide was detected in three of four HydroPunch samples obtained from the second water-bearing zone, and 2-butanone was detected in one sample. 2-Butanone is a common laboratory contaminant.
- Pesticide was detected in the northwest corner of the site (M024-E).
- TDS values ranged from 1,600 mg/L to 28,600 mg/L.

6.6 SUMMARY OF SITE CHARACTERIZATION

Based on the review of the data, it is concluded that:

- The compounds detected in soils are similar in nature to those found during previous investigations.
- The compounds that were detected in groundwater are predominantly similar in nature to those found during previous investigations. However, additional VOCs were detected in M023-E, and VOCs were first detected in the investigation in monitoring well M013-C.
- The extent of potential chemicals of interest in the soil and groundwater appears to have been adequately characterized for the purpose of conducting an RI/FS. If a human health or environmental risk is defined during the risk assessment, the need for additional investigation will be evaluated.

SECTION 7.0

7.0 THE RUNWAY AREA

The following subsections briefly discuss the site history, previous investigations, findings from previous investigations and the current CTO 280 follow-on investigation, and a summary of data completeness. A detailed description of the Runway Area, the hydrogeologic setting, and past and current activities are presented in the Phases 5 and 6 SWAT and DSR (PRC and Montgomery Watson 1993a), and the Phases 5 and 6 follow-on FSP (PRC and Montgomery Watson 1994c).

7.1 SITE DESCRIPTION

The Runway Area occupies approximately 326 acres immediately east of Sites 1 and 2 and is illustrated on Figure 2-2. The Runway Area is used for Navy aircraft and aircraft parking areas. A least tern sanctuary is located south of Taxiway No. 5, adjacent to the north side of the east/west taxiway and east of Runway 13-31. Facilities for base maintenance and storage are located north of the runways.

No chemical usage or maintenance operations have been documented in the Runway Area. Historical aerial photographs indicate that this area has been primarily used for runway and aircraft parking areas.

7.2 PREVIOUS INVESTIGATIONS

Soil and groundwater samples were collected from the Runway Area in order to establish "background" concentrations for Sites 1 and 2. As part of the SWAT investigation, 24 soil samples were collected during the construction of monitoring wells in the first water-bearing zone (PRC and Montgomery Watson 1993a). Twelve of the 24 soil samples were collected from the surface; the remaining 12 soil samples were obtained from depths ranging from 0.5 feet to 5.5 feet bgs. Eleven A-zone monitoring wells (M101-A through M111-A) were installed in the first water-bearing zone, and four wells were installed in the second water-bearing zone.

7.3

FINDINGS FROM PREVIOUS INVESTIGATIONS

Monitoring well locations discussed in this section are shown on Figure 3-2. Soil borings and surface soil sampling locations conducted during previous investigations can be referenced in the Phases 5 and 6 SWAT and DSR.

Results of organic analyses performed on soil samples collected from borings M101-A, M102-A, and M111-A indicate that soils at these locations contain VOCs, SVOCs, and pesticides/PCBs. Based on review of aerial photographs, it is suspected that the soil samples were located in areas where previous site operations such as aircraft maintenance may have occurred. TRPH was detected in surface soil samples from four of the borings.

Analytical results of groundwater samples indicated no evidence of VOCs, SVOCs, pesticides/PCBs, or TRPH in groundwater in the first or second water-bearing zones.

7.4

CTO 280 FOLLOW-ON INVESTIGATION

Field activities performed under CTO 280 at the Runway Area included CPT, HydroPunch sampling, surface soil sampling, shallow and deep monitoring well installation, and quarterly groundwater sampling. Table 7-1 presents a summary of the field program. Figures 3-1 through 3-3 show sampling locations. Tables 3-2 through 3-9 summarize the field program and analyses performed on soil and groundwater samples.

Cone Penetrometer Testing

A total of 22 CPT locations (CPT-RA-2 through CPT-RA-23) were driven in the Runway Area, at locations shown on Figure 3-2. The objectives of the CPT program were to provide sufficient information to determine if the first and second water-bearing zones are hydraulically connected beneath the Runway Area, and support the determination of the location of the paleochannel in the Runway Area, and the thickness of the second water-bearing zone.

HydroPunch Sampling

A total of 21 HydroPunch samples were collected at seven locations from the Runway Area as shown on Figure 3-2. HydroPunch samples HPRA-1-A, HPRA-4-A, HPRA-6-A, HPRA-8A, HPRA-13-A, HPRA-20-A, and HPRA-23-A were collected from the top of the first water-bearing zone; HydroPunch samples HPRA-1-E, HPRA-4-E, HPRA-6-E, HPRA-8E, HPRA-13-E, HPRA-20-E, and HPRA-23-E were collected from the bottom of the first water-bearing zone; and HydroPunch samples HPRA-1-D, HPRA-4-D, HPRA-6-D, HPRA-8-D, HPRA-13-D, HPRA-20-D, and HPRA-23-D were collected from a sand lense within the Holocene Bay Mud unit. A listing of the chemical analyses performed on these samples is shown on Table 3-3.

Surface Soil Sampling

A total of seven surface soil samples (SSRA-1 through SSRA-7) were obtained from the Runway Area, from locations shown on Figure 3-3. A listing of chemical analyses performed on these samples is shown on Table 3-4. To date, analytical results have not yet been received from the laboratory.

Soil Sampling

A total of 29 soil samples were collected at the Runway Area during the installation of seven monitoring wells (described below). Monitoring well locations are shown on Figure 3-2. Analyses conducted on soil samples are shown on Table 3-5. Results of the geotechnical analyses performed on select soil samples are included as Attachment K.

Shallow Monitoring Wells

A total of six shallow monitoring wells (M112-A, M113-A, M114-A, M115-E, M116-E, and M117-E) were installed in the first water-bearing zone at the Runway Area, at locations shown on Figure 3-2. In addition, a replacement well for M101-A that was destroyed by earth-moving equipment was installed. Shallow monitoring well construction details are shown on Table 3-7.

Deep Monitoring Wells

A total of two deep monitoring wells (M101-C and DRA-01) were installed in the second water-bearing zone at the Runway Area, at locations shown on Figure 3-2. The location of monitoring well DRA-01 was selected based on HydroPunch sampling results.

Groundwater Sampling

Groundwater monitoring well and HydroPunch locations are shown on Figure 3-2. Groundwater samples from the nine new wells are scheduled to be collected on a quarterly basis for 1 year. Groundwater samples are scheduled to be collected from the pre-existing first water-bearing zone wells on a quarterly basis, and from the previously existing second water-bearing zone wells on a semiannual basis for 1 year. The fourth quarter of groundwater sampling for CTO 280 sites is scheduled for completion in August 1995.

For the first quarter of CTO 280, groundwater samples were collected from 14 HydroPunch sample locations in the first water-bearing zone and 7 HydroPunch samples from the sand lense within the Holocene Bay Mud unit. A total of 15 groundwater samples were collected from monitoring wells in the first water-bearing zone, and 4 samples were collected from the second water-bearing zone. A listing of HydroPunch analyses and first quarter groundwater sampling analyses are shown on Tables 3-3 and 3-6, respectively.

7.5 CTO 280 FOLLOW-ON FIELD INVESTIGATION ANALYTICAL RESULTS

Tables 7-2 through 7-5 present a summary of results of chemical analyses performed on soil and first quarter groundwater samples collected from the Runway Area. Quality control information related to these samples are shown on Table 7-6. A brief discussion of the results of chemical analyses is presented below. A complete listing of analytical results is presented as Attachment B (limited distribution).

Soil

- Analytical results for organic chemical analyses performed on soil samples are shown on Table 7-2; locations are shown on Figures 3-1 and 3-3.
- Elevated levels of several chemical groups were detected in M101-C, located in the northern Runway Area. VOCs, SVOCs, TPH-E as diesel and TPH-P were detected in the 2.5-foot sample. The VOCs were primarily solvent-related VOCs; some petroleum hydrocarbon-related VOCs were also detected. There were three SVOCs detected, all of the PAH class. SVOCs and pesticides were also detected in the 0-foot sample; and VOCs, SVOCs, pesticides, and elevated levels of TPHC were detected in the 5-foot sample.
- The VOC 1,2-DCE was detected in M113-A.
- TPH-E as motor oil was detected in M113-A and M114-A.
- Lead exceeded the 10 times the STLC value in the surface sample from M113-A.
- Data from surface soil samples collected from the Runway Area have not yet been received from the laboratory.

Groundwater - First Water-Bearing Zone

- Analytical results for organic chemical analyses performed on groundwater samples are shown on Table 7-4; locations are shown on Figure 3-2.
- Elevated levels of petroleum- and solvent-related VOCs were detected in M101-A, located in the northern Runway Area.
- Solvent-related VOCs were detected in the northern Runway Area in monitoring wells M112-A and M113-A, in the center of the Runway Area in M109-A, and near Site 10A in M115-E.
- TPH-E as motor oil was detected in the northern Runway Area in monitoring wells M112-A and M113-A, and adjacent to Site 10A in monitoring well M116-E. TPH-P was detected in M112-A.
- SVOCs of the PAH class were detected in HydroPunch sample HPRA-6-A.
- The VOC carbon disulfide was detected in several monitoring wells and most of the HydroPunch samples.

- Six metals exceeded the 95/95 STI at two locations, M113-A and M115-E. Metals exceeding the 95/95 STI are shown on Table 7-4.
- TDS values ranged from 440 mg/L to 39,200 mg/L.

Groundwater - Second Water-Bearing Zone

- There were no industrially related compounds detected in the second water-bearing zone.

7.6 SUMMARY OF SITE CHARACTERIZATION

Based on the review of the data, it is concluded that:

- The compounds detected in soil and groundwater samples from the first and second water-bearing zones are similar in nature to those found during previous investigations. SVOCs of the PAH class were detected during this investigation but not during the previous investigation.
- The extent of potential chemicals of interest in the soil and groundwater appears to have been adequately characterized for the purpose of conducting an RI/FS. If a health or environmental risk is defined during the risk assessment, the need for additional investigation will be evaluated.

SECTION 8.0

8.0 SITE 3 - AREA 97, ABANDONED FUEL STORAGE AREA

The following subsections briefly discuss the site history, previous investigations, findings from previous investigations, the current CTO 280 follow-on investigation, and a summary of data completeness. A detailed description of Site 3, the hydrogeologic setting, and past and current activities are presented in the Phases 1 and 2A DSR (PRC and Montgomery Watson 1993b) and the Phase 2A follow-on FSP (PRC and Montgomery Watson 1994a).

8.1 SITE DESCRIPTION

Site 3 is shown on Figure 2-2. Site 3 is an abandoned fuel storage area that contained five 10,000-gallon storage tanks for aviation gasoline (AVGAS). The tanks were discovered to be leaking in 1975 and 1978. An estimated 365,000 gallons of AVGAS may have escaped from the storage area in the 1960s and early 1970s. By 1987, all five tanks had been drained, cleaned, and filled with water. The tanks were later destroyed and buried in place, though the exact date is unknown. Site 3 is currently covered with grass and is used for an aircraft exhibit.

8.2 PREVIOUS INVESTIGATIONS

Monitoring well locations discussed in this section are shown on Figure 3-2. Soil borings conducted during previous investigations can be referenced in the Phases 1 and 2A DSR. In 1979, the Navy contracted Kennedy Engineers to investigate the extent of subsurface fuel contamination in the vicinity of Site 3. Kennedy Engineers installed 18 monitoring wells and collected soil and groundwater samples for gasoline analysis at each location. Kennedy Engineers conducted a fuel vapor survey in the electrical duct, storm drain, and sanitary sewer manholes in the vicinity of Site 3.

A subsequent investigation was conducted by Wahler Associates in 1985 as part of the verification step of the NACIP confirmation study. Wahler Associates installed and sampled 3 new observation wells and resampled 12 wells installed by Kennedy Engineers. Wahler Associates observed subsurface soil and groundwater conditions during the construction of new utility trenches running south and west of the five former partially buried tanks. During this observation, Wahler noted free product entering a trench.

Subsequent to the Wahler Associates investigation, Canonie, in 1990, began the initial RI activities. The RI activities included a soil gas survey, drilling and installing three groundwater monitoring wells, and soil and groundwater sampling. A total of 121 soil gas samples were collected to help delineate the extent of petroleum hydrocarbon vapors in the soil. Soil samples collected during monitoring well installation and groundwater samples from these monitoring wells were analyzed to evaluate the nature and extent of AVGAS at Site 3.

8.3 FINDINGS FROM PREVIOUS INVESTIGATIONS

Monitoring well locations discussed in this section are shown on Figure 3-2. Soil borings conducted during previous investigations can be referenced in the Phases 1 and 2A DSR (PRC and Montgomery Watson 1993b). Kennedy Engineers conducted gas chromatograph analyses on soil and groundwater samples obtained at the 18 drilling locations. Kennedy Engineers concluded that the hydrocarbons detected in the samples were AVGAS. Kennedy Engineers conducted a fuel vapor survey and reported vapor concentrations ranging from non-detect to greater than 10,000 ppm. However, Kennedy Engineers concluded the fuel vapor levels exhibited no clear pattern, and the bulk of the released AVGAS migrated from the site through infiltration into storm and sanitary sewers.

Wahler Associates used a similar technique to that of Kennedy Engineers for quantifying the hydrocarbon content of groundwater samples (Wahler Associates 1985). Results from 1 of the 15 groundwater samples and a water sample obtained from a trench excavation indicated gasoline-range hydrocarbons in excess of 1 mg/L.

Elevated levels of TRPH were detected in two soil samples collected during the Canonie investigation. Results of the chemical analyses on a saturated soil sample indicated the presence of hydrocarbon compounds within the saturated zone. No free product was observed in the Canonie-installed groundwater monitoring wells and no organic compounds were detected in the groundwater samples.

Field activities performed under CTO 280 at Site 3 included CPT, HydroPunch sampling, shallow soil boring and monitoring well installation, deep monitoring well installation, quarterly groundwater sampling, NPS sampling, and GeoProbe sampling.

Table 8-1 presents a summary of the field program. Sampling locations are shown on Figures 3-1, 3-2, and 3-3. Tables 3-2 through 3-9 summarize the field program and analyses performed on soil and groundwater samples.

Cone Penetrometer Testing

A total of five CPT points (CPT-S03-01 through CPT-S03-05) were completed at Site 3, at locations shown on Figure 3-1. The objectives of the CPT program were to evaluate the lithology and hydrogeologic characteristics below a depth of 15 feet and to assess the thickness of the second water-bearing zone.

HydroPunch Sampling

A total of five HydroPunch samples (DHP-S03-01 through DHP-S03-05) were collected from the second water-bearing zone, at locations shown on Figure 3-2. A listing of the chemical analyses performed on these samples is shown on Table 3-3.

Soil Sampling

A total of 19 soil samples were collected during the installation of five monitoring wells (M03-04 through M03-08) and from CPT-S03-01 at Site 3. Soil sampling locations are shown on Figure 3-1. A listing of the chemical analyses performed on these samples is shown on Table 3-5.

Shallow Monitoring Wells

A total of five shallow monitoring wells (M03-04 through M03-08) were installed at Site 3 in the first water-bearing zone, at locations shown on Figure 3-2. Well locations were selected based on GeoProbe investigation results. Shallow monitoring well construction details are shown on Table 3-7.

Deep Monitoring Well

One deep monitoring well (D03-01) was installed in the second water-bearing zone at Site 3 as shown on Figure 3-2. The location of the deep monitoring well at Site 3 was selected based on HydroPunch sampling samples.

Groundwater Sampling

Groundwater monitoring well locations are shown on Figure 3-2. A total of four quarterly groundwater sampling events are scheduled for monitoring wells at Site 3. The fourth quarter of groundwater sampling for CTO 280 sites is scheduled for completion in August 1995.

Groundwater samples were collected from eight shallow monitoring wells in the first water-bearing zone at Site 3. Groundwater samples were also collected from the second water-bearing zone monitoring well D03-01 and from five deep HydroPunch locations DHP-S03-01 through DHP-S03-05. Listings of HydroPunch analyses and first quarter groundwater sampling analyses are shown on Tables 3-3 and 3-6, respectively.

Non-Point Source Sampling

A total of five NPS samples (NPS-S03-01, -02, -03, -04, and -07) were collected at Site 3, at locations shown on Figure 3-3. A listing of chemical analyses performed on these samples is shown on Table 3-9.

GeoProbe Investigation

GeoProbe locations are shown on Figures 3-1 and 3-2. A GeoProbe investigation using soil and groundwater test kits was conducted at Site 3 to estimate the extent of petroleum hydrocarbon concentrations prior to finalizing the locations of shallow soil borings and monitoring wells. A summary of the GeoProbe investigation is presented in Attachment J. CLP analytical results are shown on Tables 8-2 and 8-4.

8.5 CTO 280 FOLLOW-ON INVESTIGATION ANALYTICAL RESULTS

Tables 8-2 through 8-6 present a summary of results of chemical analyses performed on soil samples, first quarter groundwater samples, and NPS samples collected at Site 3. Quality control information related to these samples are shown on Table 8-7. A brief discussion of the results of chemical analyses are presented below. A complete listing of analytical results is presented as Attachment B (limited distribution).

Soil

- Analytical results for organic chemical analyses performed on soil samples are shown on Table 8-2; locations are shown on Figure 3-1.
- Petroleum hydrocarbon-related VOCs and TPH-P were detected in soil samples collected north and northwest of this site, in boring M03-04 and CPT-S03-01. TPH-E as motor oil was detected at each sampling location, and in 11 of the 19 soil samples. The highest concentration of TPH-E as motor oil was found east of the site, in the surface soil sample collected from boring M03-07.
- Two metals exceeded 10 times the STLC from three locations. Metals exceeding 10 times the STLC value are shown on Table 8-3.

Groundwater - First Water-Bearing Zone

- Analytical results for organic chemical analyses performed on groundwater samples are shown on Table 8-4; locations are shown on Figure 3-2.
- VOCs typically associated with solvents were detected in the northwest corner of Site 3 (M03-06).

- Figures 8-1 and 8-2 illustrate the distribution of TPH-E as motor oil and TPH-P as unleaded gasoline, respectively, in the first water-bearing zone in the southeast portion of the base.
- Three SVOCs were detected in monitoring well M03-07 (east of Site 3).
- TPH-E as motor oil was detected in five of the eight monitoring wells sampled and TPH-E as diesel was detected in two wells. The most elevated TPH-E was in the northeast portion of Site 3.
- TPH-P was detected in two wells (M03-05 and M03-07).
- Six metals exceeded the 95/95 STI in five of the eight wells located at Site 3. Metals exceeding the 95/95 STI are shown on Table 8-5.
- Total dissolved solids values ranged from 746 mg/L to 27,000 mg/L.

Groundwater - Second Water-Bearing Zone

- Analytical results for organic chemical analyses performed on groundwater samples are shown on Table 8-4; locations are shown in Table 3-2.
- Petroleum hydrocarbon-related VOCs and TPH-P were detected northwest of Site 3 in monitoring well D03-01.
- The VOCs 2-butanone and chloroform were detected south of the site in the groundwater sample collected from DHP-S03-05. The chemical 2-butanone is a common laboratory contaminant.
- Total dissolved solids concentrations ranged from 6,800 mg/L to 53,600 mg/L.

Non-Point Source Samples

- Results for organic chemical analyses performed on the five NPS samples collected at Site 3 are shown on Table 8-6; locations are shown on Figure 3-3.
- One VOC was detected in each sample collected from NPS-S03-01 and NPS-S03-07.
- Elevated levels of PAH-class SVOCs were detected in three of the five NPS samples collected.
- Elevated levels of TPH-E as motor oil were detected in all of the NPS samples, and slightly elevated levels of TPH-P were detected in NPS-S03-07.

Based on the review of the data, it is concluded that:

- Compounds detected in the soil are similar in nature to those detected during previous investigations.
- Solvent-related compounds were detected in the groundwater in the first water-bearing zone during this investigation, but not during previous investigations.
- Petroleum hydrocarbon-related VOCs and TPH-P were detected in the second water-bearing zone during this investigation; the second water-bearing zone was not sampled during previous investigations.
- Additional investigation will be evaluated for Site 3 if a health or environmental risk is identified during the risk assessment due to the extent of gasoline compounds and TPH concentrations in groundwater in the first and second water-bearing zones.

SECTION 9.0

9.0 SITE 6 - BUILDING 41, AIRCRAFT INTERMEDIATE MAINTENANCE FACILITY

The following subsections briefly discuss the site history, previous investigations, findings from previous investigations, the current CTO 280 investigation, and a summary of data completeness. A detailed description of Site 6, the hydrogeologic setting, and past and current activities are presented in the Phases 2B and 3 DSR (PRC and JMM 1992b).

9.1 SITE DESCRIPTION

Site 6 is shown on Figure 2-2. Site 6 consists of Building 41 and is located approximately 600 feet north of the Seaplane Lagoon. Building 41 was formerly used as a hangar for seaplanes and to store 55-gallon drums of waste from repair and maintenance activities. The drums reportedly contained PD-680 dry cleaner (a Stoddard solvent-based material), trichlorofluoroethane, 6083 oil, 1,1,1-TCA, paint wastes and strippers, and hydraulic fluids. Rinse waters from a former paint stripping tank located on the southwest corner of Building 41 flowed into a sewer manhole that discharged to the sanitary sewer system.

Building 41 is currently used for the repair of aircraft components such as hydraulics, brakes, avionics, engines, electrical wiring, and instrumentation.

9.2 PREVIOUS INVESTIGATIONS

In 1991, the PRC team performed an initial RI at this site as part of the Phases 2B and 3 investigation. The investigation at Site 6 focused on the past storage and cleaning activities and the sewer system. Nineteen soil borings were drilled around the perimeter of Building 41, and groundwater monitoring wells were constructed in five of the borings.

9.3 FINDINGS FROM PREVIOUS INVESTIGATIONS

Monitoring well locations discussed in this section are shown on Figure 3-2. Soil borings conducted during previous investigations can be referenced in the Phases 2B and 3 DSR. Soil samples collected from borings on all sides of Building 41 contained SVOCs as follows: SVOCs were detected from

2.5 to 11 feet bgs at the southern side of the building; from 6.5 to 11 feet bgs at the northern side; from the surface to 8 feet bgs at the western side; and from 8 to 14 feet bgs at the eastern side. In general, concentrations of SVOCs were higher in samples collected from native soils than in the overlying fill materials. Concentrations of beryllium in soils are elevated compared to other sites included in the Phases 2B and 3 investigations. It is not known if beryllium has been used at the site.

PCE, TCE, vinyl chloride, and 1,2-DCE were detected in groundwater samples collected from monitoring wells M06-01 and M06-02, located near the wash pad/paint stripping area.

9.4 CTO 280 FOLLOW-ON INVESTIGATION

Field activities performed under CTO 280 at Site 6 included CPT, HydroPunch sampling, shallow soil sampling, shallow monitoring well installation, quarterly groundwater sampling, and NPS sampling. Table 9-1 presents a summary of the field program. Sampling locations are shown on Figures 3-1 through 3-3. Tables 3-2 through 3-9 summarize the field program and analyses performed on soil and groundwater samples.

Cone Penetrometer Testing

A total of four CPT sampling points (CPT-S06-01 through CPT-S06-04) were completed at Site 6, at locations shown on Figure 3-1. The objectives of the CPT program were to evaluate the lithology and hydrogeologic characteristics below a depth of 15 feet, and to assess the thickness of the second water-bearing zone.

HydroPunch Sampling

A total of four HydroPunch samples (DHP-S06-01 through DHP-S06-04) were collected from the second water-bearing zone, at locations shown on Figure 3-2. A listing of the chemical analyses performed on these samples is shown on Table 3-3.

Soil Sampling

A total of 25 soil samples were collected from four soil borings (B06-20 through B06-23) and one monitoring well (M06-06) at Site 6. Soil sampling locations are shown on Figure 3-1 and monitoring well locations are shown on Figure 3-2. A listing of the chemical analyses performed on these samples is shown on Table 3-5.

Shallow Monitoring Well

One monitoring well (M06-06) was installed in the first water-bearing zone at Site 6 as shown on Figure 3-2. Shallow monitoring well construction details are shown on Table 3-7.

Groundwater Sampling

Groundwater monitoring well locations are shown on Figure 3-2. A total of four quarterly groundwater sampling events are scheduled for monitoring wells at Site 6. The fourth quarter of groundwater sampling for CTO 280 sites is scheduled for completion in August 1995.

Groundwater samples were collected from six monitoring wells located in the first water-bearing zone around the perimeter of Building 41. Groundwater samples from the second water-bearing zone were collected from four HydroPunch locations at Site 6. Listings of HydroPunch analyses and first quarter groundwater sampling analyses are shown on Tables 3-3 and 3-6, respectively.

Non-Point Source Sampling

A total of three NPS sediment samples (NPS-S06-01, NPS-S06-02, and NPS-S06-03) were collected at Site 3, at locations shown on Figure 3-3. A listing of chemical analyses performed on these samples is shown on Table 3-9.

9.5

FOLLOW-ON INVESTIGATION ANALYTICAL RESULTS

Tables 9-2 through 9-5 present a summary of results of chemical analyses performed on soil and first quarter groundwater samples collected at Site 6. Quality control information related to these samples are shown on Table 9-6. A brief discussion of the results of chemical analyses are presented below. A complete listing of analytical results is presented as Attachment B (limited distribution).

Soil

- Results of organic chemical analyses performed on soil samples are shown on Table 9-2; locations are shown on Figure 3-1.
- The VOC 1,2-DCE was detected in the 14-foot soil sample collected from borings B06-21 and B06-22, southwest of Building 41.
- Elevated levels of SVOCs of the PAH class were detected in 6 of the 25 soil samples collected from the soil borings. All borings in which there were detections are located west and southwest of Site 6; the SVOCs were detected from 2.5 to 10 feet bgs.

Groundwater - First Water-Bearing Zone

- First quarter results of organic chemical analyses performed on groundwater samples from the first water-bearing zone are shown on Table 9-3; locations are shown on Figure 3-2.
- VOCs typically associated with solvents were detected adjacent to the southwest corner of Building 41 (monitoring wells M06-01 and M06-02). Solvent-related VOCs were detected along the west edge of the building (M06-06). In addition, acetone, chloromethane, and 2-butanone were detected in the groundwater sample collected from DHP-S06-04. Acetone and 2-butanone are common laboratory contaminants.
- Figure 9-1 illustrates the distribution of TCE detected in the first water-bearing zone.
- TPH-P was detected in one groundwater sample collected from M06-06.
- Five metals exceeded the 95/95 STI in five of the six wells. Metals exceeding the 95/95 STI are shown on Table 9-4.

Groundwater - Second Water-Bearing Zone

- First quarter results of organic chemical analyses performed on groundwater samples are shown on Table 9-3; locations are shown on Figure 3-2.
- Three VOCs were detected in two of the HydroPunch samples. Acetone was detected northeast of Building 41 (DHP-S06-02), and chloromethane and 2-butanone was detected southwest of Building 41 (DHP-S06-04). 2-Butanone is a common laboratory contaminant.

Non-Point Source Sampling

- Results of organic chemical analyses performed on NPS samples are shown on Table 9-5; locations are shown on Figure 3-3.
- TPH-E as motor oil was detected at all three NPS sample locations, and TPH-P was detected in two of three NPS samples.
- Three VOCs were detected in NPS-S09-02.
- Eight SVOCs of the PAH class were detected in NPS-S09-03. Phenol was detected in NPS-S09-02.

9.6 SUMMARY OF SITE CHARACTERIZATION

Based on the review of the data, it is concluded that:

- The compounds detected in the soil and groundwater during this investigation are similar in nature and extent to those found during previous investigations.
- The extent of potential chemicals of interest in the groundwater appears to have been adequately characterized for the purpose of conducting an RI/FS. If a health or environmental risk is identified during the risk assessment, the need for additional investigation will be evaluated.

SECTION 10.0

10.0 SITE 7A - BUILDING 459, NAVY EXCHANGE FUEL STATION

The following subsections briefly discuss the site history, previous investigations, findings from previous investigations, current CTO 280 follow-on investigation, and a summary of data completeness. A detailed description of Site 7A, the hydrogeologic setting, and past and current activities are presented in the Phases 2B and 3 DSR (PRC and Montgomery Watson 1993b), and the Phases 2B and 3 follow-on FSP (PRC and Montgomery Watson 1994b).

10.1 SITE DESCRIPTION

Site 7A is located near the eastern boundary of NAS Alameda as shown on Figure 2-2. Building 459 is the main structure within Site 7A. This site has served as the NAS Alameda fuel station since 1966. An auto repair shop and a small convenience store are part of the station facilities. The fuel islands are located on the eastern portion of the site and a former transformer pad is located at the northern boundary of the site. No information on the history of use of transformers at the site or documentation of leaks, is available. A total of eight underground storage tanks (USTs) were located at the fuel station.

Four 10,000-gallon USTs are located northwest of the fuel islands. Three of the four 10,000-gallon tanks (two contain unleaded gasoline and one contains premium gasoline) failed a tank precision tightness test in 1987. It is assumed that repairs were made because the three tanks reportedly passed leak tests in 1991. The fourth tank was taken out of service at an unknown date due to a suspected leak.

Two USTs (10,000 and 8,000 gallons) located west of the fuel islands were abandoned in place due to leakage. Both tanks stored leaded gasoline and were scheduled for closure in 1987. The tanks were removed during the spring of 1995.

Two abandoned USTs (500 gallons each) are located to the north of Building 459. One tank stored solvents and the other tank stored waste oil. The types of solvents stored are unknown. The waste oil tank has been inactive since failing a vacuum tightness test in December 1991 and was reported to

be leaking in 1992. Both tanks were scheduled for closure in 1987. The tanks were removed during the spring of 1995.

10.2 PREVIOUS INVESTIGATIONS

In 1987, Environmental Resource Management-West (ERM-West) performed an investigation at Site 7A at the request of EFA-West. The investigation was initiated after petroleum product was detected in an excavation adjacent to the fuel station (ERM-West 1987). The investigation included drilling 17 soil borings and constructing three monitoring wells.

Canonie initiated RI activities, in 1991, that included soil gas surveying, borehole drilling, soil sampling, monitoring well construction, and groundwater sampling. The soil gas survey was used to help delineate the downgradient extent of hydrocarbons detected in soil vapors. Seven soil borings were drilled and groundwater monitoring wells were constructed in four of the borings.

10.3 FINDINGS FROM PREVIOUS INVESTIGATIONS

Monitoring well locations discussed in this section are shown on Figure 3-2. Soil borings conducted during previous investigations can be referenced in the Phases 2B and 3 DSR. Soil results from shallow borings located north and south of the abandoned USTs indicate the presence of gasoline constituents to depths of 5 feet bgs and total petroleum hydrocarbons at depths ranging from 0 to 3 feet bgs.

SVOCs of the PAH class were detected in all soil borings at the site, most frequently between 3 and 7 feet bgs.

Pesticides were detected in three previous borings, and elevated lead concentrations were detected in the southwestern portion of the site.

Fuel constituents have been detected in shallow groundwater wells north, south, and in the backfill material of the existing and abandoned USTs and the existing pump islands. Total petroleum hydrocarbons were detected in wells in the backfill material of the abandoned and active USTs.

The soil gas survey indicated areas of elevated benzene concentrations near the fuel island, and areas of lower benzene concentrations east of the fuel island.

10.4 CTO 280 FOLLOW-ON INVESTIGATION

Field activities performed under CTO 280 at Site 7A include CPT, HydroPunch sampling, surface soil sampling, soil sampling, shallow and deep monitoring well installation, quarterly groundwater sampling, and NPS sampling. Table 10-1 presents a summary of the field program. Figures 3-1 through 3-3 show sample locations. Tables 3-2 through 3-9 summarize the field program and analyses performed on soil and groundwater samples.

Cone Penetrometer Testing

A total of 11 CPT points were driven at Site 7A. Four of the eleven CPT points (CPT-S07A-01 through CPT-S07A-04) were driven to evaluate the lithology and hydrogeologic characteristics below a depth of 15 feet and to assess the thickness of the second water-bearing zone (Figure 3-1).

The remaining seven additional CPT points (CPT-S07A-05 through CPT-S07A-11) were driven to assess the lithology for HydroPunch sampling at locations north and east of Site 7A.

HydroPunch Sampling

A total of 15 HydroPunch samples were collected from Site 7A, at locations shown on Figure 3-2. Four deep HydroPunch groundwater samples (DHP-S07A-01 through DHP-S07A-04) were collected from the second water-bearing zone. Eleven HydroPunch samples were collected from the first water-bearing zone at Site 7A. The first water-bearing zone samples were obtained from the north end of Site 7A and east of Site 7A to assist in the evaluation of gasoline constituents in groundwater. Seven HydroPunch groundwater samples (SHP-S07A-05 through SHP-S07A-11) were collected from the fill layer in the first water-bearing zone, and four HydroPunch groundwater samples (DHP-S07A-05, DHP-S07A-07, DHP-S07A-09, and DHP-S07A-11) were collected from the underlying Holocene Bay Mud unit. A listing of chemical analyses performed on these samples is shown on Table 3-3.

Surface Soil Sampling

Two surface soil samples (S07A-01 and S07A-02) were collected from Site 7A, at locations shown on Figure 3-3. A listing of chemical analyses performed on these samples is shown on Table 3-4.

Soil Sampling

Eighteen soil samples were collected at Site 7A from three soil borings (B07A-10, B07A-11, and B07A-12) and two monitoring wells (M07A-08 and M07A-09). Soil sampling locations are shown on Figure 3-1 and monitoring well locations are shown on Figure 3-2. A listing of chemical analyses performed on these samples is shown on Table 3-5.

Shallow Monitoring Wells

Two shallow monitoring wells (M07A-08 through M07A-09) were installed in the first water-bearing zone east of Site 7A, at locations shown on Figure 3-2. Shallow monitoring well construction details are shown on Table 3-7.

Deep Monitoring Wells

Three deep monitoring wells (D07A-01, D07A-02, and D07A-03) were installed in the second water-bearing zone at Site 7A as shown on Figure 3-2. The locations of the deep monitoring wells at Site 7A were selected based on HydroPunch sampling results. Deep monitoring wells D07A-01, D07A-02, and D07A-03 were located to provide horizontal groundwater flow direction information in the second water-bearing zone.

Monitoring wells D07A-02 and D07A-03 are clustered with shallow monitoring wells M07A-03 and M07A-02, respectively, to allow for evaluation of vertical groundwater gradients and migration. Monitoring wells D07A-01 and D07A-02 are located at the eastern boundary of Site 7A to monitor groundwater quality in the second water-bearing zone in this area.

Groundwater Sampling

Groundwater monitoring well and HydroPunch locations are shown on Figure 3-2. A total of four quarterly groundwater sampling events are scheduled for the shallow and deep monitoring wells at Site 7A. The fourth quarter of groundwater sampling for CTO 280 sites is scheduled for completion in August 1995.

Groundwater samples were collected from 12 shallow monitoring wells and 7 shallow HydroPunch locations in the first water-bearing zone, and 3 deep monitoring wells and 4 HydroPunch locations from the second water-bearing zone. Listings of HydroPunch analyses and first quarter groundwater sampling analyses are shown in Tables 3-3 and 3-6, respectively.

Non-Point Source Sampling

A total of two NPS samples were collected at Site 7A, at locations shown on Figure 3-3. A listing of chemical analyses performed on these samples is shown on Table 3-9.

10.5 CTO 280 FOLLOW-ON INVESTIGATION ANALYTICAL RESULTS

Tables 10-2 through 10-6 present a summary of results of chemical analyses performed on soil and first-quarter groundwater samples collected at Site 7A. Quality control information related to these samples are shown on Table 10-7. A brief discussion of the results of chemical analyses are presented below. A complete listing of analytical results is presented as Attachment B (limited distribution).

Soil

- Results of organic chemical analyses performed on soil samples are shown on Table 14-2; locations are shown on Figure 3-1.
- TPH-E as motor oil was detected at all depths in M07A-08 and from the 2.5-foot bgs sample in M07A-09.

- Metals exceeding 10 times the STLC value are shown on Table 10-3. Metals exceeded 10 times the STLC value in four soil samples from four locations.

Groundwater - First Water-Bearing Zone

- Results of organic chemical analyses performed on groundwater samples are shown on Table 10-4; locations are shown on Figure 3-2.
- Figures 10-1, 10-2, 10-3, and 10-4 illustrate the distribution of BTEX, TPH-E as motor oil, TPH-E as diesel, and TPH-P as unleaded gasoline, respectively, in the first water-bearing zone.
- Elevated levels of petroleum hydrocarbon-related VOCs such as BTEX, TPH-E, and TPH-P were detected in the vicinity of the tanks. The highest concentrations of BTEX, TPH-E as diesel, and TPH-P were detected in the vicinity of the northernmost USTs, in monitoring wells W-1 and W-2.
- Petroleum hydrocarbon-related VOCs were detected adjacent to the abandoned tanks, west of the pump islands, in W-3.
- Petroleum hydrocarbon-related VOCs were detected in the northern area of Site 7A, in monitoring wells and shallow HydroPunch samples.
- Elevated levels of petroleum hydrocarbon-related VOCs and TPH-E and TPH-P were detected east of Site 7A (SHP-S07A-10 and -11).
- Solvent-related VOCs were detected in the vicinity of the waste oil tanks (M07A-01), and low levels of 1,1-DCA were detected in the northern area of Site 7A (M07A-04).
- The SVOC 4-methylphenol was detected in the northern area of Site 7A (M07A-05).
- Seven metals exceeded the 95/95 STI in 11 of the wells located at Site 7A. Metals exceeding the 95/95 STI are shown on Table 10-5.
- TDS values ranged from 586 mg/L to 27,900 mg/L.

Groundwater - Second Water-Bearing Zone

- Results of organic chemical analyses performed on groundwater samples are shown on Table 10-3; locations are shown on Figure 3-2.
- Elevated levels of petroleum hydrocarbon-related VOCs were detected in the northeast corner of Site 7A, in monitoring well D07A-01.

- TPH-E as diesel and TPH-P were detected in monitoring well D07A-01.
- SVOCs were detected in D07A-01. The SVOCs were PAH compounds and 2,4-dimethylphenol.
- TPH-E as motor oil was detected in all of the second water-bearing zone HydroPunch samples. TPH-P was detected in the DHP-S07A-02.
- Petroleum hydrocarbon-related VOCs were detected south of the pump islands, in sample DHP-S07A-02. Carbon disulfide and xylene were detected in sample DHP-S07A-04.
- TDS values ranged from 17,000 mg/L to 18,000 mg/L.

Non-Point Source Samples

- Results of organic chemical analyses performed on NPS samples are shown on Table 10-6; locations are shown on Figure 3-3.
- Elevated levels of TPH-E as motor oil were detected in both NPS samples. TPH-P was detected in NPS-S07A-02.

10.6 SUMMARY OF SITE CHARACTERIZATION

Based on the review of the data, it is concluded that:

- The compounds detected in soils and groundwater samples from the first water-bearing zone are similar in nature to those found during previous investigations. The concentrations of the petroleum hydrocarbon-related VOCs in first water-bearing zone groundwater appears to have decreased from earlier investigations.
- Elevated levels of TPH-E and petroleum hydrocarbon-related VOCs were detected in the second water-bearing zone during this investigation. Groundwater samples were not collected from the second water-bearing zone during previous investigations.
- Additional investigation will be evaluated at Site 7A if a health or environmental risk is identified during the risk assessment due to the extent of TPH-E and petroleum hydrocarbon-related VOCs in the second water-bearing zone.

SECTION 11.0

11.0 SITES 7B AND 11 - BUILDING 162 AND BUILDING 14, FORMER SERVICE STATION AND ENGINE TEST CELL

The following subsections briefly discuss site histories, previous investigations, findings from previous investigations and the current CTO 280 follow-on investigation, and a summary of data completeness. A detailed description of Sites 7B and 11, the hydrogeologic setting, and past and current activities are presented in the Phases 2B and 3 DSR (PRC and Montgomery Watson 1993b), and the Phases 2B and 3 follow-on FSP (PRC and Montgomery Watson 1994b).

11.1 SITE DESCRIPTION

Sites 7B and 11 are located on the southwest corner of Atlantic Avenue and Eighth Street, at locations shown on Figure 2-2. Building 162 is located on Site 7B and Building 14 is located on Site 11. Because of their proximity to one another, the sites have historically been discussed together, and are discussed together in this document.

Site 7B was reportedly used by the Navy Exchange as a service station (date of reported use not available). During a March 1988 site visit, Canonie representatives were unable to locate information about the quantity, size, location or disposition of any USTs associated with the former service station. Recently obtained information suggests the area now occupied by Building 162 was not used as a service station. However, remnant underground piping suggests the presence of USTs near the northeast corner of Building 162. Public Works Center (PWC) personnel have indicated that two small oil-bearing USTs with 100- and 150-gallon capacities are located at Building 162. Building 162 is currently used as a maintenance shop for ship components. Machine shops and maintenance shops are located inside of the building.

Site 11 is located directly south of Site 7B. Since its construction in 1946, Building 14 has been used for aircraft engine testing. The building is divided into 12 test cells. Each of the test cells contain floor drains that lead to an industrial waste gravity sewer system. In 10 of the cells, the drains reportedly lead to USTs. The drains in the other two cells (currently in use) lead to an oil water separator and subsequently to the storm sewer. Fuel for engine testing is supplied from a tank farm

south of Building 14, via piping which extends along the south wall to the rooftop of Building 14. Fuel types used in testing include AVGAS, JP-5, and JP-7.

11.2 PREVIOUS INVESTIGATIONS

Building 162 is located approximately 200 feet southwest of IRP Site 3 where an AVGAS leak was discovered in 1975. During investigations in 1979 and 1985 at Site 3, three monitoring wells were installed (OW-2, OW-21, and WA-8) around Site 7B for the purpose of detecting contamination coming from the Site 3 AVGAS leak (Kennedy Engineers 1980; Wahler Associates 1985). Two of the wells indicated AVGAS contamination.

In 1991, the PRC team performed the initial RI at this site as part of Phases 2B and 3. Three soil borings were drilled at Site 7B and a groundwater monitoring well was constructed in one of the borings. Seven soil borings were drilled at Site 11 and groundwater monitoring wells were installed in four of the borings. In addition to sampling groundwater in the newly constructed monitoring well, groundwater was collected from the existing monitoring well WA-8. Existing monitoring wells OW-2 and OW-21 were not located at the time of the investigation.

11.3 FINDINGS FROM PREVIOUS INVESTIGATIONS

Monitoring well locations discussed in this section are shown on Figure 3-2. Soil borings conducted during previous investigations can be referenced in the Phases 2B and 3 DSR.

Solvent- and petroleum hydrocarbon-related VOCs were detected at both sites. TRPH was detected in the surface soil sample at all of the borings at both sites, except one (B11-02). TRPH concentrations in these borings may be related to USTs near boring B11-04 or past activities along a former rail spur near boring B11-05.

Common industrial solvents were found in three of the groundwater samples, including TCE, 1,1-DCA, benzene, total 1,2-DCE, and vinyl chloride.

Field activities performed under CTO 280 at Sites 7B and 11 included CPT, HydroPunch sampling, shallow soil boring and monitoring well installation, deep monitoring well installation, quarterly groundwater sampling, NPS sampling, and a geophysical survey. Table 11-1 presents a summary of the field program. Sampling locations are shown on Figures 3-1, 3-2, and 3-3. Tables 3-2 through 3-9 summarize the field program and analyses performed on soil and groundwater samples.

Cone Penetrometer Testing

A total of four CPT points (CPT-S07B-01, CPT-S07B-02, CPT-S11-01, and CPT-S11-02) were driven at Site 7B, at locations shown on Figure 3-1. The objectives of the CPT program were to evaluate the lithology and hydrogeologic characteristics below a depth of 15 feet and to identify the depth of the second water-bearing zone.

HydroPunch Sampling

Four HydroPunch samples (DHP-S07B-01, DHP-S07B-02, DHP-S11-01, and DHP-S11-02) were collected from the second water-bearing zone as shown on Figure 3-2. A listing of chemical analyses performed on these samples is shown on Table 3-3.

Soil Sampling

A total of 36 soil samples were collected at Sites 7B and 11 from nine soil borings (B7B-04 and B7B-05 and B11-08 through B11-14) and two monitoring wells (M11-05 and M11-06). Soil sampling locations are shown on Figure 3-1 and monitoring well locations are shown on Figure 3-2. A listing of analyses performed on these samples is shown on Table 3-5. Results of geotechnical analyses performed on these samples are included as Attachment K.

Shallow Monitoring Wells

A total of two shallow monitoring wells (M11-05 and M11-06) were installed in the first water-bearing zone at Site 11 as shown on Figure 3-2. Shallow monitoring well construction details are shown on Table 3-7.

Deep Monitoring Wells

One deep monitoring well (D11-01) was installed in the second water-bearing zone at Site 11, at locations shown on Figure 3-2. The location of the deep monitoring well at Site 11 was selected based on HydroPunch sampling results.

Groundwater Sampling

Groundwater monitoring well and HydroPunch locations are shown on Figure 3-2. A total of four quarterly groundwater sampling events are scheduled for monitoring wells at Sites 7B and 11. The fourth quarter of groundwater sampling for CTO 280 sites is scheduled for completion in August 1995.

Groundwater samples were collected from seven monitoring wells in the first water-bearing zone and four HydroPunch locations from the second water-bearing zone. Listings of HydroPunch analyses and first quarter groundwater sampling analyses are shown on Tables 3-3 and 3-6, respectively.

Geophysical Survey

Geophysical survey techniques were used to determine the presence and location of USTs suspected to be located near the northeast corner of Building 162 (Site 7B) and along the south wall of Building 14 (Site 11) near monitoring well M11-04. The geophysical survey confirmed the location of one tank on the northeast side of Building 162 and four tanks along the south wall of Building 14, which have since been removed. The geophysical survey report is included as Attachment I.

Non-Point Source Sampling

A total of three NPS sediment samples (NPS-S7B-01, NPS-S7B-02, and NPS-S11-01) were collected from Sites 7B and 11 as shown on Figure 3-3. A listing of chemical analyses performed on these samples is shown on Table 3-9.

11.5 CTO 280 FOLLOW-ON INVESTIGATION ANALYTICAL RESULTS

Tables 11-2 through 11-6 present a summary of results of chemical analyses performed on soil, first quarter groundwater, and NPS samples collected at Sites 7B and 11. Quality control information related to these samples are shown on Table 11-7. A brief discussion of the results of chemical analyses are presented below. A complete listing of analytical results is presented as Attachment B (limited distribution).

Soil

- Results of organic chemical analyses performed on soil samples are shown on Table 11-2; locations are shown on Figure 3-1.
- TPH-E as motor oil was detected in 13 of 33 soil samples from the northeast corner of Building 162 and the south-central and west sides of Building 14. TPH-P as unleaded gasoline was detected in one soil sample.
- Pesticide was detected in a soil sample in B07B-04, northeast of Building 162.
- Two metals exceeded 10 times the STLC in three soil samples. Soils exceeding 10 times the STLC are shown on Table 11-3.

Groundwater - First Water-Bearing Zone

- Results for organic chemical analyses performed on groundwater samples are shown on Table 11-4; locations are shown on Figure 3-2.
- Solvent-related VOCs were detected in four wells which are located on the north side of Building 14 and the west side of Building 162. Petroleum hydrocarbon-related VOCs were detected in well M11-01 located on the north side of Building 14.

- Figures 8-1 and 9-1 illustrate the distribution of TPH-E as motor oil and TCE, respectively, detected in samples of groundwater from the first water-bearing zone.
- Elevated levels of TPH-E as motor oil was detected in four wells, primarily from the southwest and northeast portions of Site 7B/11. TPH-E as diesel and TPH-P were detected on the northwest side of Building 14 in M11-01.
- Three metals exceeded the 95/95 STI in four wells located throughout Site 11. Metals exceeding the 95/95 STI are shown on Table 11-5.
- TDS values ranged from 684 mg/L to 7,700 mg/L.

Groundwater - Second Water-Bearing Zone

- Results for organic chemical analyses performed on groundwater samples are shown on Table 11-4; locations are shown on Figure 3-2.
- Solvent-related VOCs were detected in HydroPunch sample DHP-S11-02 located at the southeast corner of Building 14.
- TPH-E as motor oil was detected in all four HydroPunch samples.
- TDS values ranged from 2,070 mg/L to 44,500 mg/L.

Non-Point Source Samples

- Results of organic chemical analyses performed on NPS samples are shown on Table 11-6; locations are shown on Figure 3-3.
- SVOCs of the PAH class were detected in two NPS samples. An elevated level of bis(2-ethylhexyl)phthalate was detected in NPS-S11-01.
- Elevated levels of TPH-E as motor oil were detected in all four NPS samples.

11.6 SUMMARY OF SITE CHARACTERIZATION

Based on the review of the data, it is concluded that:

- The compounds detected in the soil are similar in nature to those detected during previous investigations.

- Solvent-related VOCs and TPH-E were detected in HydroPunch samples obtained from the second water-bearing zone during this investigation. Groundwater samples were not collected from the second water-bearing zone during previous investigations.
- Additional investigation will be evaluated at Sites 7B and 11 if a health or environmental risk is defined during the risk assessment due to the extent of VOCs in groundwater in the second water-bearing zone.

SECTION 12.0

12.0 SITE 7C - BUILDING 547, SERVICE STATION

The following subsections briefly discuss the site history, previous investigations, findings from previous investigations and the current CTO 280 follow-on investigation, and a summary of data completeness. A detailed description of Site 7C, the hydrogeologic setting, and past and current activities are presented in the Phases 1 and 2A DSR (PRC and Montgomery Watson 1993b), and the Phase 2A follow-on FSP (PRC and Montgomery Watson 1994a).

12.1 SITE DESCRIPTION

Site 7C is a former on-base annex service station not currently in operation, and is located near the eastern perimeter of the base, at locations shown on Figure 2-2. A service station operated on site between 1971 and 1980; a car wash facility also existed on the site. Site 7C is currently vacant.

Three 12,000-gallon underground fiberglass fuel tanks exist on site. The underground fuel tanks are located in the northwest corner of the property. In 1980, one of the 12,000-gallon underground fuel tanks was ruptured and has since been drained and repaired. In 1987, during a tank testing survey conducted by Environmental Resources Management, feed lines to the same tank were reported leaking; they were removed and replaced. Following a failed precision tightness test during a 1988 tank testing survey, fuel from the tank was removed.

In addition to the three 12,000-gallon fuel tanks, one 10,000-gallon stainless steel underground waste oil tank and one 5,000-gallon underground stainless steel waste oil tank are reportedly located on site. NAS Alameda plot plans for the site do not show the locations of the waste oil tanks. All five underground tanks are presumed to have been installed in 1971.

12.2 PREVIOUS INVESTIGATIONS

The initial RI field activities conducted by Canonie at Site 7C included a soil gas survey, borehole drilling and monitoring well construction, and groundwater sampling. Ten soil borings were drilled and groundwater monitoring wells were constructed in five of the borings. The soil gas survey was performed in an attempt to delineate the extent of hydrocarbons detected in soil vapors.

12.3

FINDINGS FROM PREVIOUS INVESTIGATIONS

Monitoring well locations discussed in this section are shown on Figure 3-2. Soil borings conducted during previous investigations can be referenced in the Phases 1 and 2A DSR. Analytical results from shallow soil borings located on the north and south sides of the former service station indicate the presence of gasoline constituents to depths of 12 feet bgs.

TPH was detected in soil throughout the site at depths ranging from 1 to 6 feet bgs.

SVOCs of the PAH class were detected in shallow borings north and south of the service station to depths of 5 feet bgs; phthalates were detected in shallow borings north and south of the service station to depths of 15 feet bgs.

Fuel constituents, TPH, and PAHs have been detected in shallow groundwater wells south and southeast of the service station.

12.4

CTO 280 FOLLOW-ON INVESTIGATION

Field activities performed under CTO 280 at Site 7C included CPT, HydroPunch sampling, shallow soil boring and monitoring well installation, deep monitoring well installation, quarterly groundwater sampling, NPS sampling, and a geophysical survey. Table 12-1 presents a summary of the field program. Sampling locations are shown on Figures 3-1, 3-2, and 3-3. Tables 3-2 through 3-9 summarize the field program and analyses performed on soil and groundwater samples.

Cone Penetrometer Testing

A total of four CPT points (CPT-S07C-01 through CPT-S07C-04) were driven at Site 7C, at locations shown on Figure 3-1. The objectives of the CPT sampling were to evaluate the lithology and hydrogeologic characteristics below a depth of 15 feet.

HydroPunch Sampling

A total of four HydroPunch samples were collected as shown on Figure 3-2. HydroPunch samples DHP-S07C-01 through DHP-S07C-04 were collected from the second water-bearing zone at Site 7C. A listing of the chemical analyses performed on these samples is shown on Table 3-3.

Soil Sampling

A total of 29 soil samples (27 chemical and 2 geotechnical) were collected at Site 7C from five soil borings (B7C-11 through B7C-15) and four monitoring wells (M07C-06 through M07C-09) as shown on Figure 3-1. Soil boring locations are shown on Figure 3-1 and monitoring well locations are shown on Figure 3-2. A listing of the chemical and geotechnical analyses performed on these samples is shown on Table 3-5.

Shallow Monitoring Wells

A total of four shallow monitoring wells (M07C-06 through M07C-09) were installed at Site 7C, at locations shown on Figure 3-2. Shallow monitoring well construction details are shown on Table 3-7.

Deep Monitoring Well

One deep monitoring well (D7C-01) was installed at Site 7C, at locations shown on Figure 3-2. The location of the deep monitoring well at Site 7C was based on HydroPunch sampling results.

Groundwater Sampling

Groundwater monitoring well and HydroPunch locations are shown on Figure 3-2. A total of four quarterly groundwater sampling events are scheduled for monitoring wells at Site 7C. The fourth quarter of groundwater sampling for CTO 280 sites is scheduled for completion in August 1995.

Groundwater samples were collected from nine shallow monitoring wells, one deep monitoring well, and four deep HydroPunch. Listings of HydroPunch analyses and first quarter groundwater sampling analyses are shown on Tables 3-3 and 3-6, respectively.

Non-Point Source Sampling

One NPS sediment sample (NPS-S07C-01) was collected at Site 7C, at locations shown on Figure 3-3. A listing of chemical analyses performed on this sample is shown on Table 3-9.

Geophysical Survey

Geophysical survey techniques were used to determine the presence and location of two waste oil tanks suspected to be located near the western portion of the site, directly southwest of Building 547. The two waste oil tanks were not located. The geophysical survey report is included as Appendix I.

12.5 CTO 280 FOLLOW-ON INVESTIGATION ANALYTICAL RESULTS

Tables 12-2 through 12-6 present a summary of results of chemical analyses performed on soil, first quarter groundwater, and NPS samples collected at Site 7C. Quality control information related to these samples are shown on Table 12-7. A brief discussion of the results of chemical analyses are presented below. A complete listing of analytical results is presented as Attachment B (limited distribution).

Soil

- Analytical results for organic chemical analyses performed on soil samples are shown on Table 12-2; locations are shown on Figure 3-1.
- TPH-E as motor oil was detected in 14 of 28 soil samples from throughout the central and southern portions of the site. TPH-P was detected in 10 soil samples from throughout the site. The highest concentrations were, in general, detected in the western portion of the site from boring B7C-14 and southeast of Site 7C from M07C-07.

- Elevated levels of petroleum hydrocarbon-related VOCs were detected in B7C-12 and B7C-14. Less elevated levels were detected in four other soil samples in the northwest portion of the site. Acetone was also detected in one sample. Acetone is a common laboratory contaminant.
- SVOCs of the PAH class were detected in five soil samples.
- Lead exceeded 10 times the STLC in four soil samples. Metals in soil exceeding 10 times the STLC are shown on Table 12-3.

Groundwater - Shallow Zone

- Analytical results for organic chemical analyses performed on groundwater samples are shown on Table 12-4; locations are shown on Figure 3-2.
- Petroleum hydrocarbon-related VOCs were detected in three wells in the northwest and west portions of the site; the highest levels were detected in MW547-3.
- SVOCs of the PAH class were detected in wells MW547-3 and MW547-4, located in the southwest portion of Site 7C.
- Figures 8-1 and 8-2 illustrate the distribution of TPH-E as motor oil and TPH-P as unleaded gasoline, respectively, detected in samples from the first water-bearing zone in the southeast portion of NAS Alameda.
- Elevated levels of TPH-P were detected in the southwest portion of the site, in monitoring well MW547-3. TPH-E as motor oil was detected in M07C-07, located in the southeast portion of the site. TPH-E as diesel was detected in MW547-1, MW547-3, and MW547-4.
- Four metals (including beryllium, nickel, zinc, and mercury) exceeded the 95/95 STI in nine wells located throughout Site 7C. Groundwater samples exceeding 95/95 STI are shown on Table 12-5.
- TDS values ranged from 480 mg/L to 1,570 mg/L.

Groundwater - Deep Zone

- Analytical results for organic chemical analyses performed on groundwater samples are shown on Table 12-4; locations are shown on Figure 3-2.
- VOCs were detected in two deep HydroPunch samples (DHP-S07C-01 and DHP-S07C-03).

- The SVOC pentachlorophenol was detected in one HydroPunch sample (DHP-S07C-02).
- Elevated levels of TPH-E as motor oil were detected in deep HydroPunch sample DHP-S07C-03. TPH-E as motor oil was detected in the other three HydroPunch samples, and TPH-P was detected in DHP-S07C-01 and 02.
- TDS values ranged from 520 mg/L to 1,600 mg/L.

Non-Point Source Samples

- Results of organic chemical analyses performed on NPS samples are shown on Table 12-6; locations are shown on Figure 3-3.
- TPH-E as motor oil was detected in sample NPS-S07C-01.

12.6 SUMMARY OF SITE CHARACTERIZATION

- The compounds detected in soils and groundwater samples in the first water-bearing zone are similar in nature to those found during previous investigations.
- Elevated levels of TPH-E as motor oil were detected in a deep HydroPunch sample during this investigation. Groundwater samples were not obtained from the second water-bearing zone during previous investigations.
- Additional investigation will be evaluated at Site 7C if a health or environmental risk is defined during the risk assessment due to the extent of TPH-E as motor oil in groundwater.

SECTION 13.0

13.0 SITE 9 - BUILDING 410, PAINT STRIPPING

The following subsections briefly discuss the site history, previous investigations, findings from previous investigations, the current CTO 280 follow-on investigation, and a summary of data completeness. A detailed description of Site 9, the hydrogeologic setting, and past and current activities are presented in the Phases 1 and 2A DSR (PRC and Montgomery Watson 1993b), and the Phase 2A follow-on FSP (PRC and Montgomery Watson 1994a).

13.1 SITE DESCRIPTION

Site 9 is approximately 1 acre in size and consists of Building 410 and a paved area east of the building, as shown in Figure 2-2. Building 410 formerly housed aircraft paint stripping operations for NAS Alameda. Wastewater from the paint stripping operation contained oil, paint, paint skins, detergent, and paint stripper. The wastewater was discharged to an industrial waste treatment facility. The construction date of the industrial waste treatment facility is not known. Prior to the construction of the facility, wastewater from Building 410 was discharged directly to the industrial sewer without pretreatment.

13.2 PREVIOUS INVESTIGATIONS

As part of the Naval Air Rework Facility (NARF) Industrial Waste Survey conducted in 1981, composite samples were taken from Building 410 wastewater for chemical analysis.

A site investigation was performed in 1990 by Canonie. The focus of the field investigation was to determine if chemicals from surface spills or leaks in the subsurface sewer system have impacted soils and groundwater at the site. Nine soil borings were drilled at the site; monitoring wells were installed in four of the nine borings, one on each side of Building 410. Soil and groundwater samples were collected from Site 9 during this investigation.

Monitoring well locations discussed in this section are shown on Figure 3-2. Soil borings conducted during previous investigations can be referenced in the Phases 1 and 2A DSR.

The initial assessment study (E&E 1983) from the 1981 NARF survey found high concentrations of chromium, phenol, surfactants, and total solids, and high biological oxygen demand (BOD) and chemical oxygen demand (COD) in the wastewater. The composite analyses performed on the wastewater discharges from Building 410 detected cadmium, zinc, variable pH, suspended solids, oil and grease, methylene chloride, chloroform, and TCA.

Analytical results from soil samples collected by Canonie in 1990 indicate the presence of toluene from 3 to 15.5 feet bgs on all sides of Building 410. SVOCs (phthalates and PAH) were detected in soil from the surface to 15.5 feet bgs. The greatest concentrations of SVOCs were found on the east and north side of Building 410.

Seventeen metals are present in the soil samples collected by Canonie at concentrations exceeding the 95/95 STI of background concentrations at NAS Alameda (PRC and Montgomery Watson 1993a). However, all metals analyzed were within the range of concentrations typically found in soils (Dragun 1988), with the exception of magnesium.

No VOCs or SVOCs were detected in the groundwater at Site 9. Twelve metals were detected in the groundwater at concentrations exceeding the 95/95 STI for background concentrations. However, arsenic, iron, manganese, and potassium do not exceed the extreme upper limit of concentrations that are typically found in groundwater (Dragun 1988). Vanadium was detected above extreme upper limits typically found in groundwater. The concentration of zinc in the groundwater samples exceeded the background limit but not the typical concentration limit found in groundwater (Dragun 1988).

Field activities performed under CTO 280 at Site 9 included CPT, HydroPunch sampling, soil sampling, shallow monitoring well installation, shallow piezometer installation, deep monitoring well installation, quarterly groundwater sampling, NPS sampling, and a floor drain video inspection. Table 13-1 presents a summary of the field program. Figures 3-1 through 3-3 show sampling locations. Tables 3-2 through 3-9 summarize the field program and analyses performed on soil and groundwater samples.

Cone Penetrometer Testing

Twelve CPT points (CPT-S09-01 through CPT-S09-12) were driven at Site 9 as shown on Figure 3-1. The objectives of the CPT sampling were to evaluate the lithology and hydrogeologic characteristics below a depth of 15 feet, and to assess the thickness of the second water-bearing zone.

HydroPunch Sampling

Twenty HydroPunch samples were collected as shown on Figure 3-2. Eight shallow HydroPunch samples (CPT-S09-05 through CPT-S09-12) were collected along the drain line. The HydroPunch samples were obtained from those portions of the drain line which that were inaccessible by the camera during the video survey. Twelve deep HydroPunch samples (DHP-S09-01 through DHP-S09-12) were collected from the second water-bearing zone. A listing of the chemical analyses performed on these samples is shown on Table 3-3.

Soil Sampling

A total of 24 soil samples were collected from 6 of the 12 CPT locations (CPT-S09-05 through CPT-S09-10) and from two monitoring wells (M09-05 and M09-06) at Site 9, at locations shown on Figure 3-1. The CPT locations are shown on Figure 3-1 and the monitoring well locations are shown on Figure 3-2. A listing of the chemical analyses performed on these samples is shown on Table 3-5.

Shallow Monitoring Wells

Two shallow monitoring wells (M09-05 and M09-06) were installed in the first water-bearing zone at Site 9, at locations shown on Figure 3-2. Shallow monitoring well construction details are shown on Table 3-7.

Shallow Piezometers

Piezometer locations are shown on Figure 3-2. Six shallow piezometers were installed adjacent to CPT points (CPT-S09-05 through CPT-S09-10) to monitor groundwater elevation data for evaluating groundwater flow direction in the first water-bearing zone.

Deep Monitoring Well

One deep monitoring well (D09-01) was installed in the second water-bearing zone at Site 9, at locations shown on Figure 3-2. The location of the deep monitoring well at Site 9 was based on HydroPunch sampling results. Deep monitoring well construction details are shown on Table 3-8.

Groundwater Sampling

Groundwater monitoring well and HydroPunch locations are shown on Figure 3-2. A total of four quarterly groundwater sampling events are scheduled for monitoring wells at Site 9. The fourth quarter of groundwater sampling for CTO 280 sites is scheduled for completion in August 1995.

Groundwater samples were collected from five monitoring wells and eight HydroPunch in the first water-bearing zone, and from one monitoring well and twelve HydroPunch in the second water-bearing zone. Listings of HydroPunch analyses and first quarter groundwater sampling analyses are shown on Tables 3-3 and 3-6, respectively.

Non-Point Source Sampling

A total of three NPS sediment samples (NPS-S09-01 through NPS-S09-03) were collected at Site 9, at locations shown on Figure 3-3. A listing of chemical analyses performed on these samples is shown on Table 3-9.

Floor Drain Video Inspection

Due to the age of the drain line in Building 410, a video inspection was conducted to identify cracks and/or corrosion of the lines that may have served as source areas for chemical migration to the groundwater. Results of the inspection were used to guide the HydroPunch sampling locations.

The video survey did not indicate cracking or leaks along the portions of the drain line that were accessible by the camera. Some portions of the drain line were inaccessible due to obstructions in the line.

13.5 CTO 280 FOLLOW-ON INVESTIGATION ANALYTICAL RESULTS

Tables 13-2 through 13-5 present a summary of results of chemical analyses performed on soil and first quarter groundwater samples collected at Site 9. Quality control information related to these samples are shown on Table 13-6. A brief discussion of the results of chemical analyses are presented below. A complete listing of analytical results is presented as Attachment B (limited distribution).

Soil

- Results of organic chemical analyses performed on soil samples are shown on Table 13-2; locations are shown on Figure 3-1.
- The VOC 1,2-DCE was detected at 0.5 feet bgs in CPT-S09-10. Petroleum hydrocarbon-related VOCs were detected in soil samples collected along the drain line; the highest concentrations were detected in the southeastern portion of the drain line.

Groundwater - First Water-Bearing Zone

- Results of organic chemical analyses performed on groundwater samples are shown on Table 13-3; locations are shown on Figure 3-2.
- Solvent-related VOCs were detected in groundwater samples collected from monitoring wells around the perimeter of Site 9 (MW410-2 and MW410-4). TPH-E as diesel was detected north of Building 410 (MW410-1), and TPH-E as motor oil was detected east, west, and south of Building 410. TPH-P was detected east of the site in MW410-2.
- Figures 8-1 and 8-2 illustrates the distribution of TPH-E as motor oil and TPH-P as unleaded gasoline, respectively, in samples collect from the first water-bearing zone in the southeastern portion of NAS Alameda.
- Analysis of shallow HydroPunch samples obtained adjacent to the underground drain line in Building 410 indicate several types of VOCs. A total of 12 VOCs were detected in these groundwater samples, including solvent-related and petroleum hydrocarbon-related VOCs. The highest concentrations of solvent- and petroleum hydrocarbon-related VOCs were detected in SHP-S06-06 (northern portion of Site 9) and SHP-S06-10 (southern portion of Site 9). Both types of VOCs were detected in SHP-S09-11 and SHP-S09-12.
- Naphthalene was detected in groundwater samples collected adjacent to the underground drain line. PAH class SVOCs were detected in SHP-S09-11, as well as 4-methylphenol in SHP-S09-01.
- Carbon disulfide was detected in groundwater collected from several shallow monitoring wells and HydroPunch locations.
- Seven metals exceeded the 95/95 STI in six of the HydroPunch samples collected from the first water-bearing zone. Metals exceeding the 95/95 STI are shown on Table 8-5.
- TDS levels ranged from 200 mg/L to 6,930 mg/L.

Groundwater - Second Water-Bearing Zone

- Results of organic chemical analyses performed on groundwater samples are shown on Table 13-3; locations are shown on Figure 3-2.

- Mostly solvent-related VOCs were detected in the second water-bearing zone. In addition, carbon disulfide and 4-methyl-2-pentanone were detected east of the northern portion of the underground drain lines.
- TDS levels ranged from 1,080 mg/L to 28,000 mg/L.

Non-Point Source Samples

- Results of organic chemical analyses performed on NPS samples are shown on Table 14-5; locations are shown on Figure 3-3.
- Elevated levels of SVOCs and TPH-P and TPH-E were detected in each of the NPS samples. Between 5 and 10 SVOCs (PAH class) were detected.
- VOCs were detected in NPS-S10B-01 and NPS-S10B-02.

13.6 SUMMARY OF SITE CHARACTERIZATION

Based on the review of the data, it is concluded that:

- The compounds detected in the soil and groundwater samples during this investigation varied from those found during previous investigations. This is likely due to the collection of the most recent samples from adjacent to the industrial drain lines. Areas of concern appear to be in close proximity to the drain lines.
- The extent of potential chemicals of interest in the soil and groundwater appear to have been adequately characterized for the purpose of conducting an RI/FS. If a health or environmental risk is defined during the risk assessment, the need for additional investigation will be evaluated.

SECTION 14.0

14.0 SITE 10B - BUILDING 530, MISSILE REWORK OPERATIONS

The following subsections briefly discuss the site history, previous investigations, findings from previous investigations and the current CTO 280 follow-on investigation, and a summary of data completeness. A detailed description of Site 10B, the hydrogeologic setting, and past and current activities are presented in the Phases 1 and 2A DSR (PRC and Montgomery Watson 1993b), and the Phase 2A follow-on FSP (PRC and Montgomery Watson 1994a).

14.1 SITE DESCRIPTION

Site 10B, consisting of Building 530, is located to the west and south of the South Gate of NAS Alameda, and on the south side of IRP Site 13, at locations shown on Figure 2-2. Since its construction in 1972, Building 530 has been used for missile rework operations. Current operations include electrical maintenance, cleaning, grinding, welding, painting, paint stripping, and parts fabrication. Wastes generated by these processes are disposed of in 55-gallon drums and shipped to an off-site facility.

14.2 PREVIOUS INVESTIGATIONS

Canonie performed a site investigation in 1990. The investigation was intended to evaluate the presence of VOCs, SVOCs, metals, or TPH in the soil and groundwater in the vicinity of Building 530. Three soil borings were drilled, sampled, and converted to groundwater monitoring wells for the investigation (MW530-1, MW530-2 and MW530-3). Two of the borings were placed at the juncture of the sanitary sewer and storm sewer lines because these junctions "would be more likely to leak, and because wastes might be more prone to pool at elbow and T-joints where soil has been excavated to deeper depths" (Canonie 1990).

14.3 FINDINGS FROM PREVIOUS INVESTIGATIONS

Monitoring well locations discussed in this section are shown on Figure 3-2. Soil borings conducted during previous investigations can be referenced in the Phases 1 and 2A DSR.

SECTION 14.4
CTO 280 FOLLOW-ON INVESTIGATION

FINAL REMEDIAL INVESTIGATION/FEASIBILITY
STUDY (RI/FS); DATA TRANSMITTAL
MEMORANDUM, VOL 1 OF 2

THE ABOVE IDENTIFIED SECTION IS NOT
AVAILABLE.

EXTENSIVE RESEARCH WAS PERFORMED BY
NAVFAC SOUTHWEST TO LOCATE THIS
SECTION. THIS PAGE HAS BEEN INSERTED AS A
PLACEHOLDER AND WILL BE REPLACED
SHOULD THE MISSING ITEM BE LOCATED.

QUESTIONS MAY BE DIRECTED TO:

DIANE C. SILVA
RECORDS MANAGEMENT SPECIALIST
NAVAL FACILITIES ENGINEERING COMMAND
SOUTHWEST
1220 PACIFIC HIGHWAY
SAN DIEGO, CA 92132

TELEPHONE: (619) 532-3676

HydroPunch Sampling

A total of seven HydroPunch samples were collected as shown on Figure 3-2. Two shallow HydroPunch samples (SHP-S10B-05 and SHP-S10B-06) and five deep HydroPunch samples (DHP-S10B-01 through DHP-S10B-05) were collected from Site 10B. A listing of the chemical analyses performed on these samples is shown on Table 3-3.

Soil Sampling

Fifteen soil samples were collected from three soil borings (B10B-04, B10B-05, and B10B-06) and one monitoring well (M10B-01) at Site 10B. Soil boring locations are shown on Figure 3-1 and the monitoring well location is shown on Figure 3-2. A listing of the chemical analyses performed on these samples is shown on Table 3-5.

Shallow Monitoring Wells

One shallow monitoring well (M10B-01) was installed at Site 10B, at locations shown on Figure 3-2. Shallow monitoring well construction details are shown on Table 3-7.

Shallow Piezometers

Piezometer locations are shown on Figure 3-2. Two shallow piezometers were installed adjacent to CPT-S10B-05 and CPT-S10B-06 to monitor groundwater elevation data.

Deep Monitoring Wells

Two deep monitoring wells (D10B-01 and D10B-02) were installed at Site 10B, at locations shown on Figure 3-2. The location of the monitoring wells at Site 10B were selected based on HydroPunch sampling results. Deep monitoring well construction details are shown on Table 3-8.

Groundwater Sampling

Groundwater monitoring well and HydroPunch locations are shown on Figure 3-2. A total of four quarterly groundwater sampling events are scheduled for monitoring wells at Site 10B. The fourth quarter of groundwater sampling for CTO 280 sites is scheduled for completion in August 1995.

Groundwater samples were collected from four shallow monitoring wells and two shallow HydroPunch locations and from five deep HydroPunch and two deep monitoring wells. Listings of HydroPunch analyses and first quarter groundwater sampling analyses are shown on Tables 3-3 and 3-6, respectively.

Non-Point Source Sampling

A total of two NPS sediment samples (NPS-S10B-01 and NPS-S10B-02) were collected at Site 10B, at locations shown on Figure 3-3. A listing of chemical analyses performed on these samples is shown on Table 3-9.

14.5 CTO 280 FOLLOW-ON INVESTIGATION ANALYTICAL RESULTS

Tables 14-2 through 14-5 present a summary of results of chemical analyses performed on soil and first quarter groundwater samples collected at Site 10B. Quality control information related to these samples are shown on Table 14-6. A brief discussion of the results of chemical analyses are presented below. A complete listing of analytical results is presented as Attachment B (limited distribution).

Soil

- Results of organic chemical analyses performed on soil samples are shown on Table 14-2; locations are shown on Figure 3-1.
- SVOC was detected at the southwest corner of Building 530 (B10B-06). TPH-E as motor oil was detected in soil samples obtained from the north end of Building 530 (B10B-07), and the northwest corner of the building (M10B-01).

Groundwater - Shallow Zone

- Results of organic chemical analyses performed on groundwater samples are shown on Table 14-3; locations are shown on Figure 3-2.
- Petroleum hydrocarbon-related VOCs were detected in groundwater samples collected northwest of Building 530, from monitoring well MW530-1 and in SHP-S10B-06. 2-Butanone was detected west of the building, in SHP-S10B-05. The chemical 2-butanone is a common laboratory contaminant.
- SVOCs were detected in MW530-1.
- Figures 8-1 and 8-2 illustrate the distribution of TPH-E as motor oil and TPH-P as unleaded gasoline, respectively, detected in samples from the first water-bearing zone in the southeast portion of NAS Alameda.
- TPH-E as motor oil was detected in all of the shallow wells and both of the shallow HydroPunch locations. TPH-P was detected in MW530-1 and in HydroPunch sample SHP-S10B-05.
- Four metals exceeded the 95/95 STI in two of the wells. Metals exceeding the 95/95 STI are listed in Table 14-4.

Groundwater - Deep Zone

- Results of organic chemical analyses performed on groundwater samples are shown on Table 14-3; locations are shown on Figure 3-2.
- TPH-E as diesel was detected northwest of Building 530 in DHP-S10B-01. TPH-E as motor oil was detected in deep HydroPunch samples DHP-S10B-02, -03, and -04. TPH-P was detected in DHP-S10B-01.

Non-Point Source Samples

- Results of organic chemical analyses performed on NPS samples are shown on Table 14-5; locations are shown on Figure 3-3.
- SVOCs, TPH-E, and TPH-P were detected in both of the NPS samples. Between 5 and 10 SVOCs (PAH class) were detected.
- VOCs were also detected in both NPS samples.

Based on the review of the data, it is concluded that:

- The compounds detected in soil and groundwater samples collected from the first water-bearing zone are similar in nature to those found during previous investigations. TPH-E and TPH-P were detected in the second water-bearing zone to a depth of 40 feet bgs during this investigation. The second water-bearing zone was not sampled during previous investigations.
- Additional investigation will be evaluated at Site 10B if a health or environmental risk is defined during the risk assessment due to the extent of VOC or TPH-E concentrations detected in deep groundwater samples.

SECTION 15.0

15.0 SITE 13 - FORMER OIL REFINERY

The following subsections briefly discuss the site history, previous investigations, findings from previous investigations and the current CTO 280 follow-on investigation, and a summary of data completeness. A detailed description of Site 10B, the hydrogeologic setting, and past and current activities are presented in the Phases 1 and 2A DSR (PRC and Montgomery Watson 1992b), and the Phase 2A follow-on FSP (PRC and Montgomery Watson 1994a).

15.1 SITE DESCRIPTION

Site 13 is approximately 30 acres in size and is located in the southeast corner of NAS Alameda, at locations shown on Figure 2-2. Site 13 was formerly occupied by the Pacific Coast Oil Works refinery, which operated between 1879 and 1903. Refinery wastes and asphaltic residues were dumped at the site during refinery operations. The refinery consisted of pump and lubricating houses, stills, two laboratories and agitators, and approximately 19 aboveground iron oil storage tanks, six underground iron storage tanks and a storage area containing drums of oil.

The area once occupied by the refinery was later surfaced by the Navy. Sometime in the 1940s, a surface rupture occurred as a result of vapor pressure buildup from underground hydrocarbons and refinery wastes. The Navy excavated an area approximately 30 feet by 30 feet (depth not recorded), and a concrete slab was placed in the bottom of the excavation, which was then backfilled and resurfaced.

Several Naval facilities now exist on the site of the former oil refinery. A former on-base annex service station, Building 547 (Site 7C), is located in the northeast corner of the former oil refinery area. In the northwest corner is a hazardous waste storage yard (Site 19) that is currently in operation. A missile rework facility is housed in Building 530 (Site 10B) that is located in the southern portion of the former oil refinery area.

In February 1991, a JP-5 release occurred on the east side of Building 397, which is located in the northwestern corner of Site 13. Following a period of heavy rains, several storm drain manholes overflowed, resulting in a pool of water that was covered with free-product hydrocarbon. Twelve

manholes in the area of Building 397 were found to contain floating free-product hydrocarbon. Groundwater in the area may have been impacted by the JP-5 flowing into the storm sewer and subsequently leaking from damaged storm sewer lines.

15.2 PREVIOUS INVESTIGATIONS

In 1989, the Navy contracted Harding Lawson Associates (HLA) to conduct a geotechnical investigation in preparation for construction of two proposed buildings known as the Intermediate Maintenance Facility (IMF). The buildings were to be located south and southeast of Building 397, within the former oil refinery site. As part of this investigation, HLA drilled 18 soil borings and installed one groundwater monitoring well in one of the soil borings.

As a result of the HLA investigation findings, the Navy was directed by the DTSC to initiate soil removal in the center of Site 13, in the vicinity of soil boring B-7 (not shown on map but located approximately 50 feet southeast of HP-S13-02). The PRC team was contracted by the Navy in 1991 to perform a Phase I assessment of the extent of lead contamination and low pH soils around soil boring B-7. Eight soil borings were drilled and one monitoring well was installed.

Due to discrepancies between field pH screening results and laboratory results for two of the samples collected in the Phase I assessment, the DTSC requested additional pH sampling. A Phase II field investigation was conducted by the PRC team to study the soil pH. Samples were collected from surface soils immediately adjacent to each of the eight Phase I soil borings. In addition, subsurface soil samples were collected immediately adjacent to soil borings B-IMF-04, B-IMF-06, and B-7. Two subsurface soil samples were collected from each site.

The Phase II investigation confirmed the low pH near soil boring B-7 but did not fully characterize the extent of the low pH levels. At the request of the DTSC, an additional soil and groundwater investigation (Phase III) was performed at the proposed IMF site. The focus of the investigation was to further evaluate the pH and the extent of lead in the immediate vicinity of soil boring B-7. For the Phase III investigation, the PRC team drilled three soil borings (B-IMF-09 through B-IMF-11) and installed one additional groundwater monitoring well (M-IMF-02).

In 1990, Canonie conducted an investigation at Site 13. The focus of the investigation at Site 13 during the Canonie investigation was to determine if residual chemicals from the oil refinery operation were leaching into the groundwater. The investigation conducted by Canonie at Site 13 included drilling 27 soil borings, installing monitoring wells in five of the borings, and soil and groundwater sampling.

15.3 FINDINGS FROM PREVIOUS INVESTIGATIONS

Monitoring well locations discussed in this section are shown on Figure 3-2. Soil borings conducted during previous investigations can be referenced in the Phases 1 and 2A DSR.

Free hydrocarbon product was encountered in one boring and hydrocarbon stains or odors were noted in 9 of the 18 soil borings during the investigation conducted by HLA. Eleven soil samples contained detectable concentrations of TPH, and oil and grease.

Hydrocarbon stains and odors were noted in all borings drilled during the investigation conducted by the PRC team in 1991. In addition, 0.7 feet of free hydrocarbon product accumulated in the monitoring well installed during this investigation.

The PRC team Phase II investigation confirmed the low pH near boring B-7 but did not fully characterize the extent of the low pH levels, resulting in a Phase III soil and groundwater investigation. Oil-soaked sands and a hydrocarbon odor were frequently encountered during the drilling of the soil borings. Tar- or coal-like materials were present in a number of the soil core samples. The Phase III investigation concluded that low pH (less than 2) soils were common within a 6-foot radius of boring B-7. Three of the four groundwater samples had low pH and elevated levels of lead. High lead levels were also identified in soil samples in close proximity to boring B-7. In general, the low pH and elevated lead concentrations correlated with the presence of a black, tar-like material and appeared restricted to the immediate area around boring B-7.

Soil samples collected during the investigation conducted by Canonie detected VOCs (mainly BTEX) from several depths ranging from 2.5 feet to 14 feet bgs. The highest BTEX concentrations detected were from the saturated zone.

SVOCs, consisting of phthalates and PAH, were detected in most of the soil samples typically collected from depths between 10 and 14 feet bgs during the Canonie investigation. Total recoverable petroleum hydrocarbons (TRPH) were detected in 46 of 107 soil samples analyzed. All metals analyzed were within the range of concentrations typically found in soils (Dragun 1988), with the exception of copper, lead, magnesium, selenium, and zinc.

Groundwater samples collected from monitoring well MW-1, located at a former oil storage area for the former oil refinery (southeast corner of Building 397), had elevated concentrations of BTEX compounds and SVOCs. TRPH was also detected southwest of the former oil refinery area.

Fourteen metals were present in the groundwater at concentrations exceeding the 95/95 STI of background concentrations at NAS Alameda.

15.4 CTO 280 FOLLOW-ON INVESTIGATION

Field activities performed under CTO 280 at Site 13 included CPT, HydroPunch sampling, shallow soil boring and monitoring well installation, deep monitoring well installation, quarterly groundwater sampling, NPS sampling, and GeoProbe sampling. Table 15-1 presents a summary of the field program. Figures 3-1 through 3-3 show sampling locations. Tables 3-2 through 3-9 summarize the field program, as well as analyses performed on soil and groundwater samples.

Cone Penetrometer Testing

A total of four CPT points (CPT-S13-02 through CPT-S13-05) were completed at Site 13 as shown on Figure 3-1. The objectives of the CPT program were to evaluate the lithology and hydrogeologic characteristics below a depth of 15 feet.

HydroPunch Sampling

Four deep HydroPunch samples (DHP-S13-02 through DHP-S13-05) were collected from Site 13, at locations shown on Figure 3-2. A listing of the chemical analyses performed on these samples is shown on Table 3-3.

Soil Sampling

A total of 27 soil samples were collected from five soil borings (B13-28 through B13-32) and four monitoring wells (M13-06, -07, -08, and -09) at Site 13. Soil boring locations are shown on Figure 3-1 and monitoring well locations are shown on Figure 3-2. A listing of the chemical analyses performed on these samples is shown on Table 3-5.

Shallow Monitoring Wells

Four shallow monitoring wells (M13-06 through M13-09) were installed at Site 13, at locations shown on Figure 3-2. Shallow monitoring well construction details are shown on Table 3-7.

Deep Monitoring Well

One deep monitoring well (D13-01) was installed at Site 13, at locations shown on Figure 3-2. The location of the monitoring well at Site 13 was selected based on HydroPunch sampling results. Deep monitoring well construction details are shown on Table 3-8.

Groundwater Sampling

Groundwater monitoring well locations are shown on Figure 3-2. A total of four quarterly groundwater sampling events are scheduled for monitoring wells at Site 13. The fourth quarter of groundwater sampling for CTO 280 sites is scheduled for completion in August 1995.

Groundwater samples were collected from ten shallow monitoring wells and from one deep monitoring well. A listing of first quarter chemical analyses performed on these samples is shown on Tables 3-6.

Non-Point Source Sampling

One NPS sediment sample, NPS-S13-01, was collected at Site 13 as shown on Figure 3-3. A listing of chemical analyses performed on this sample is shown on Table 3-9. To date, analytical results from this sample have not yet been received from the laboratory.

GeoProbe Investigation

A GeoProbe investigation was conducted at Site 13 to further assess the extent of petroleum hydrocarbons in groundwater. The data were used to assist in locating shallow soil borings and monitoring wells. A summary of the GeoProbe investigation is presented in Attachment J.

15.5 CTO 280 FOLLOW-ON INVESTIGATION ANALYTICAL RESULTS

Tables 15-2 through 15-5 present a summary of results of chemical analyses performed on soil and first quarter groundwater samples collected at Site 13. Quality control information related to these samples are shown on Table 15-6. A brief discussion of the results of chemical analyses are presented below. A complete listing of analytical results is presented as Attachment B (limited distribution).

Soil

- Analytical results for organic chemical analyses performed on soil samples are shown on Table 15-2; locations are shown on Figure 3-1.
- Acetone was detected in 3 of the 27 soil samples collected at Site 13; acetone is a common laboratory contaminant.
- Petroleum hydrocarbon-related VOCs and TPH-P were detected in the majority of the soil samples collected from borings B13-28 through B13-32, TPH-E as motor oil was detected in all of the soil samples collected from the soil borings.
- Four metals exceeded 10 times the STLC value in six soil samples collected from the southwestern portion of the site. Metals exceeding 10 times the STLC value are shown on Table 15-3.

Groundwater - Shallow Zone

- Analytical results for organic chemical analyses performed on groundwater samples are shown on Table 15-4; locations are shown on Figure 3-2.
- Benzene was detected in one monitoring well in the central portion of the site.
- SVOCs were detected in one groundwater sample collected in the central portion of the site (M13-07).
- Elevated levels of TPH-E as diesel were detected in monitoring wells in the northeast and central portions of the site. TPH-E as motor oil was detected in 3 of the 10 monitoring wells located east and in the central portion of the site. TPH-P was detected in one groundwater sample in the central portion of the site (MW-1).
- Figures 8-1 and 8-2 illustrate the distribution of TPH-E as motor oil and TPH-P as unleaded gasoline, respectively, in the southeastern portion of NAS Alameda.
- Four metals exceeded the 95/95 STI in 3 of the 10 groundwater samples. Metals exceeding the 95/95 STI are shown on Table 15-5.
- TDS levels were 224 mg/L and 8,610 mg/L in MWOR-4 and MWOR-05, respectively.

Groundwater - Deep Zone

- Analytical results for organic chemical analyses performed on groundwater samples are shown on Table 15-4; locations are shown on Figure 3-2.
- Solvent-related VOCs were detected in the deep monitoring well D13-01.
- TPH-E as motor oil was detected in all of the HydroPunch samples, excluding DHP-S13-05.
- TDS levels ranged from 250 mg/L to 1,810 mg/L.

Non-Point Source Samples

- NPS-S13-01 is shown in Figure 3-3.
- Data from this sample have not yet been received from the laboratory.

15.6

SUMMARY OF SITE CHARACTERIZATION

Based on the review of the data, it is concluded that:

- The compounds detected in soil and shallow groundwater samples are similar in nature to those found during previous investigations. TPH-E as motor oil extends to 30 feet bgs.
- Additional investigation will be evaluated at Site 13 if a human or environmental risk is defined during the risk assessment due to the extent of TPH-E concentrations in groundwater.

SECTION 16.0

16.0 SITE 15 - BUILDING 310 AND 389, TRANSFORMER STORAGE AREA

The following subsections briefly discuss the site history, previous investigations, findings from previous investigations and the current CTO 280 follow-on investigation, and a summary of data completeness. A detailed description of Site 15, the hydrogeologic setting, and past and current activities are presented in the Phases 2B and 3 DSR (PRC and JMM 1992b), and the Phases 2B and 3 Follow-On FSP (PRC and Montgomery Watson 1994b).

16.1 SITE DESCRIPTIONS

Site 15 is shown on Figure 2-2. Site 15 consists of Building 301 and former Building 389, and is located north of Runway 7-25 between the Oakland Inner Harbor and Perimeter Road. During the early 1900s, a railroad spur was constructed over and through this site for loading and off-loading freight from ships. The Navy constructed Quonset huts at the site in the 1950s.

Building 301 was used for storage of electrical equipment, oil-filled transformers, and old, unused machinery. During a site visit in March 1988, it was reported that several 55-gallon drums of hydraulic fluids were stored in Building 301 and the surface soils around Building 301 were discolored. Transformers had been stored in Building 389.

Prior to 1974, transformers were stored on bare ground in the vicinity of these buildings. An estimated 200 to 400 gallons of oil containing PCBs from transformers may have been stored at any one time. Personnel recalled occasional leaks of oil containing PCBs. The oil was drained from the transformers on a regular basis and used to spray grounds around the nearby buildings for weed control.

Currently, Building 301 and site access is restricted by a chain-link fence. A removal action began in June 1995 at Site 15 to excavate and treat soil with high concentrations of PCBs and lead.

16.2 PREVIOUS INVESTIGATIONS

Sampling of surface soils was performed by Wahler Associates during the verification step of the NACIP program (Wahler Associates 1985). Twelve surface soil samples were collected from north of the Building 389 concrete foundation and analyzed for PCBs.

The initial RI was conducted by the PRC team in 1991. The investigation entailed surface geophysics, the collection of 61 surface soil samples, soil borings, soil sampling, installation and sampling of monitoring wells, in situ permeability testing, and groundwater level measuring. A total of three soil borings were drilled near Building 301 and on the east and north sides of the site. All of the soil borings were converted to groundwater monitoring wells.

16.3 FINDINGS FROM PREVIOUS INVESTIGATIONS

Monitoring well locations discussed in this section are shown on Figure 3-2. Soil borings drilled during previous investigations can be referenced in the Phases 2B and 3 DSR. PCBs were detected at a maximum of 3 mg/kg during Wahler Associates investigation of Site 15 surface soils (Canonic 1990; Wahler Associates 1985).

Pesticides and PCBs were detected in surface soil samples collected during the initial RI. The occurrence of pesticides detected in surface soils has no readily discernable pattern and does not appear to be related to a point source. The PCB Aroclor-1260 was detected in almost all surface soil samples with concentrations ranging from 140 µg/kg to 19,000 µg/kg.

SVOCs were present in surface soil samples collected during the initial RI. The SVOCs detected in the soil samples are PAHs and phthalates. PAHs were detected in 33 of the 61 soil samples, and SVOCs were detected at 2 feet bgs in a soil sample collected from M15-01.

VOCs, SVOCs, pesticides/PCBs, and TRPH were not detected in any of the groundwater samples collected from the wells at Site 15 during the initial RI.

Field activities performed under CTO 280 at Site 15 included CPT, HydroPunch sampling, surface soil sampling, and quarterly groundwater sampling. Table 16-1 presents a summary of the field program. Figures 3-1 through 3-3 show sampling locations. Tables 3-2 through 3-9 summarize the field program and analyses performed on soil and groundwater samples.

Cone Penetrometer Testing

Two CPT points (CPT-S15-01 and CPT-S15-03) were driven on the southwestern and northern sides of Site 15, at locations shown on Figure 3-1; these locations are adjacent to a shallow monitoring well. The objectives of the CPT sampling program were to evaluate the lithology and hydrogeologic characteristics below a depth of 15 feet and to assess the thickness of the second water-bearing zone.

HydroPunch Sampling

Two HydroPunch samples (DHP-S15-01 and DHP-S15-03) were collected from the second water-bearing zone at Site 15 as shown on Figure 3-2. A listing of the chemical analyses performed on these samples is shown on Table 3-3.

Surface Soil Sampling

Eight surface soil samples (SS15-56 through SS15-63) were collected from Site 15 as shown on Figure 3-1. A listing of the chemical analyses performed on these samples is shown on Table 3-4.

Groundwater Sampling

Groundwater monitoring well and HydroPunch locations are shown on Figure 3-2. Four quarterly groundwater sampling events are scheduled for the monitoring wells at Site 15. The fourth quarter of groundwater sampling for CTO 280 sites is scheduled for completion in August 1995.

Groundwater samples were collected from two monitoring wells in the first water-bearing zone and from two HydroPunch in the second water-bearing zone. Listings of HydroPunch analyses and first quarter groundwater sampling analyses are shown on Tables 3-3 and 3-6, respectively.

16.5 CTO 280 FOLLOW-ON INVESTIGATION ANALYTICAL RESULTS

Tables 16-2 through 16-5 present a summary of results of chemical analyses performed on soil and first quarter groundwater samples collected at Site 15. Quality control information related to these samples is shown on Table 16-6. A brief discussion of the results of chemical analyses are presented below. A complete listing of analytical results is presented as Attachment B (limited distribution).

Soil

- Results of organic chemical analyses performed on soil samples are shown on Table 16-2; locations are shown on Figure 3-1.
- PAH class of SVOCs were detected in seven of the eight surface soil samples collected.
- Pesticides were detected in S15-57, -59, -61 and -63.
- Lead exceeded 10 times the STLC value in eight surface soil samples, and copper in one. Metals exceeding 10 times the STLC values are shown on Table 16-3.

Groundwater - First Water-Bearing Zone

- Results of organic chemical analyses performed on groundwater samples are shown on Table 16-4; locations are shown on Figure 3-2.
- TPH-E was detected in both monitoring wells sampled in the first water-bearing zone.
- Two metals exceeded the 95/95 STI in wells M15-01 and M15-03.
- TDS values ranged from 1,130 mg/L to 2,440 mg/L.

Groundwater - Second Water-Bearing Zone

- Results of organic chemical analyses performed on groundwater samples are shown on Table 16-4; locations are shown in Table 3-2.
- No organic compounds were detected in the second water-bearing zone.
- TDS values ranged from 35,300 mg/L to 48,600 mg/L.

16.6 SUMMARY OF SITE CHARACTERIZATION

Based on review of the data, it is concluded that:

- The compounds detected in soil samples are similar in nature and extent to those found during previous investigations, though TPH-E detected in the first water-bearing zone during the CTO 280 investigation was not detected during previous investigations.
- The extent of potential chemicals of interest in the soil and groundwater appears to have been adequately characterized for the purpose of conducting an RI/FS. If a human health or environmental risk is defined during the risk assessment, the need for additional investigation will be evaluated.

SECTION 17.0

17.0 SITE 16 - CANS C-2 AREA

The following subsections briefly discuss the site history, previous investigations, findings from previous investigations, the current CTO 280 follow-on investigation and a summary of data completeness. A detailed description of Site 16, the hydrogeologic setting, and past and current activities are presented in the Phases 1 and 2A DSR (PRC and Montgomery Watson 1993b), and the Phase 2A follow-on FSP (PRC and Montgomery Watson 1994a).

17.1 SITE DESCRIPTION

Site 16 consists of the CANS C-2 area located at the southeast corner of NAS Alameda between Avenues M and N and east of Eleventh Street as shown on Figure 2-2. The area occupies 6.5 acres; 3 acres are a storage yard and 3.5 acres contain CANS, large shipping containers that have been converted into storage containers. The storage yard formerly was used to store paints, solvents, acids and bases and transformers containing PCB oils. Reportedly, some storage containers and drums corroded and leaked, and were left open in the storage yard over a period of years (Canonie 1990). PCB oil was used for weed control in the storage yard until 1963.

Currently, the storage yard is used to store various obsolete equipment and miscellaneous equipment such as paint stripping baths, electrical equipment, and aircraft parts. The yard is primarily unpaved with temporary runway plates made of perforated steel covering much of the surface.

17.2 PREVIOUS INVESTIGATIONS

Wahler Associates collected surface soil and groundwater samples in 1985 in response to the recommendations of the initial assessment study (Wahler Associates 1985). Ten surface soil samples, one groundwater sample, and one soil sample from the monitoring well were collected.

The initial RI conducted by Canonie at Site 15 included collection of 55 surface soil samples, the drilling and sampling of nine soil borings, and installation and sampling of three monitoring wells.

17.3

FINDINGS FROM PREVIOUS INVESTIGATIONS

Monitoring well locations discussed in this section are shown on Figure 3-2. Soil borings drilled during previous investigations can be referenced in the Phases 1 and 2A DSR.

VOCs, including carbon disulfide, 1,1-DCA, 1,2-DCE, and 1,2- and 1,4-dichlorobenzene, were detected in subsurface samples over a range of depths (from 0- to 15-feet bgs) from all nine borings. Toluene was detected on the west side of the site in most soil borings at depths ranging from 2.5 to 15 feet bgs.

SVOCs (primarily PAH compounds) were detected at a majority of the surface soil sample locations and in two soil borings, MC2-2 and BC2-4, located in the northwestern portion of Site 16.

Pesticides and PCBs were detected in soil at the west side of the site at depths from the surface to 1.5 feet bgs; one location on the west side contained pesticides at 9.5 feet bgs.

Most of the 55 surface soil samples exceeded the 95/95 STI for soils. Eight samples from the 45 subsurface boring samples analyzed for metals were above the 95/95 STI for soil.

TCE was detected at low concentrations in groundwater samples collected from MWC2-1 and MWC2-2 in the northern part of the site. There were 15 occurrences of seven metals (aluminum, chromium, cobalt, copper, lead, manganese, and nickel) that were above the 95/95 STI.

17.4

CTO 280 FOLLOW-ON INVESTIGATION

Field activities performed under CTO 280 at Site 16 included CPT, HydroPunch sampling, surface soil sampling, non-point sampling, shallow soil boring and monitoring well installation, quarterly groundwater sampling, NPS sampling, and GeoProbe sampling. Table 17-1 presents a summary of the field program. Figures 3-1 through 3-3 show sampling locations. Tables 3-2 through 3-9 summarize the field program analyses performed on soil and groundwater samples.

Cone Penetrometer Testing

Four CPT points (CPT-S16-01 through CPT-S16-04) were driven at Site 16, at locations shown on Figure 3-1. The objectives of the CPT sampling were to evaluate the lithology and hydrogeologic characteristics below a depth of 15 feet.

HydroPunch Sampling

Four deep HydroPunch samples (DHP-16-01, 02, 03, and 04) were collected from Site 16, at locations shown on Figure 3-2. A listing of the chemical analyses performed on these samples is shown on Table 3-3.

Surface Soil Sampling

Sixteen surface soil samples (S16-56 through S16-71) were collected, at locations shown on Figure 3-3. A listing of the chemical analyses performed on these samples is shown on Table 3-4.

Soil Sampling

Twelve soil samples were collected from three soil borings (B16-10, B16-11, and B16-12) at Site 16, at locations shown on Figure 3-1. A listing of the chemical analyses performed on these samples is shown on Table 3-5.

Shallow Monitoring Wells

One shallow monitoring well (M16-04) was installed at Site 16, at locations shown on Figure 3-2. Shallow monitoring well construction details are shown on Table 3-7.

Groundwater Sampling

Groundwater monitoring well and HydroPunch locations are shown on Figure 3-2. Four quarterly groundwater sampling events are scheduled for monitoring wells at Site 16. The fourth quarter of groundwater sampling for CTO 280 sites is scheduled for completion in August 1995.

Groundwater samples were collected from four shallow monitoring wells and four deep HydroPunch. Listings of HydroPunch analyses and first quarter groundwater sampling analyses are shown on Tables 3-3 and 3-6, respectively.

Non-Point Source Sampling

A total of two NPS samples (NPS-S16-01 and NPS-S16-02) were collected from Site 16, at locations shown on Figure 3-3. A listing of chemical analyses performed on these samples is shown on Table 3-9.

GeoProbe Sampling

Three shallow groundwater samples were collected using GeoProbe along the eastern site border to obtain additional chemical data from the first water-bearing zone and to optimize the placement of monitoring well M16-04. GeoProbe locations are shown on Figure 3-3, and Table 17-4 presents a summary of results of chemical analyses performed on groundwater samples. Attachment J presents details regarding this investigation.

17.5 CTO 280 FOLLOW-ON INVESTIGATION ANALYTICAL RESULTS

Tables 17-2 through 17-6 present a summary of results of chemical analyses performed on soil and first quarter groundwater samples collected at Site 16. Quality control information related to these samples are shown on Table 17-7. A brief discussion of the results of chemical analyses are presented below. A complete listing of analytical results is presented as Attachment B (limited distribution).

Soil

- Analytical results for organic chemical analyses performed on soil samples are shown on Table 17-2; locations are shown on Figure 3-2.
- Pesticides were detected in four of the surface soil samples (S16-63, S16-64, S16-68, and S16-70). The highest concentrations were in S16-68, located on the southeast corner of the site.
- Lead exceeded 10 times the STLC in three surface soil samples (S16-58, S16-68 and S16-70). Metals exceeding 10 times the STLC are listed in Table 17-3.

Groundwater - Shallow Zone

- Analytical results for organic chemical analyses performed on groundwater samples are shown on Table 17-4; locations are shown on Figure 3-2.
- SVOCs were detected in MWC2-2, located on the western border of the site.
- Solvent-related VOCs, 1,2-DCE and TCE, were detected in M16-04 on the eastern edge of Site 16.
- Two metals exceeded the 95/95 STI in two of the wells. Metals exceeding the 95/95 STI are listed in Table 17-5.
- TDS values ranged from 149 mg/L to 382 mg/L.

Groundwater - Deep Zone

- Analytical results for organic chemical analyses performed on groundwater samples are shown on Table 17-4; locations are shown on Figure 3-2.
- No organic compounds were detected in the second water-bearing zone.
- TDS values ranged from 1,960 mg/L to 20,700 mg/L.

Non-Point Source Samples

- Analytical results for organic chemical analyses performed on NPS samples are shown on Table 17-6; locations are shown on Figure 3-3.

- VOCs and SVOCs were detected in both NPS samples.
- Pesticides were detected in NPS-S16-02.

17.6 SUMMARY OF SITE CHARACTERIZATION

Based on the review of the data, it is concluded that:

- The compounds detected in soil and shallow groundwater are similar in nature and extent to those found during previous investigations.
- The extent of potential chemicals of interest in the soil and groundwater appears to have been adequately characterized for the purpose of conducting an RI/FS. If a human health or environmental risk is defined during the risk assessment, the need for additional investigation will be evaluated.

SECTION 18.0

18.0 SITE 19 - YARD D13, HAZARDOUS WASTE STORAGE

The following subsections briefly discuss the site history, previous investigations, findings from previous investigations and the current CTO 280 follow-on investigation, and a summary of data completeness. A detailed description of Site 19, the hydrogeologic setting, and past and current activities are presented in the Phases 1 and 2A DSR (PRC and Montgomery Watson 1993b) and the Phase 2A follow-on FSP (PRC and Montgomery Watson 1994a).

18.1 SITE DESCRIPTION

Site 19 (Yard D-13) is located east of Ninth Street and north of K Street in an area southwest of Building 360, in the northwest corner of Site 13, at locations shown on Figure 2-2. The site is enclosed by fences and encompasses approximately 1.5 acres. Building 616 is located in the northwest corner of the yard. Yard D-13 has been used to store empty 55-gallon drums and drums containing hazardous wastes generated on the base. Drums containing wastes are segregated by chemical type and stored in separate bermed areas. The surface of the yard was repaved in March 1988.

In February 1991, a JP-5 release occurred on the east side of Building 397, located southwest of Site 19. JP-5 was discovered in the storm sewer and industrial waste sewer systems that serve Building 397. An underground fuel supply line to Building 397 is located under Ninth Street and K Street.

Yard D-13 is currently in use as a permitted storage area under the Resource Conservation and Recovery Act (RCRA) for containerized hazardous wastes generated by activities on NAS Alameda.

18.2 PREVIOUS INVESTIGATIONS

An initial RI was performed in 1990 by Canonie. The focus of the field investigation was to determine if contamination from surface spills or leaks had impacted the soils and groundwater at the site. Sixteen soil borings were drilled at this site and 174 subsurface soil samples were collected from depths of 0.5 to 15 feet bgs. Monitoring wells were installed in 4 of the 16 borings, 2 on the west side of the yard, 1 on the north side, and 1 on the south side of the yard.

18.3 FINDINGS FROM PREVIOUS INVESTIGATIONS

Monitoring well locations discussed in this section are shown on Figure 3-2. Soil borings drilled during previous investigations can be referenced in the Phases 1 and 2A DSR.

Toluene was detected in all but 2 of the 80 samples that were collected from the 16 soil borings and analyzed for VOCs. Xylenes (total) were detected in six samples from four borings in the northern half of the site.

2-Butanone (a common laboratory contaminant) was detected in five samples from five borings in the southern part of the site. Low levels of carbon disulfide, 1,1,1-TCA, PCE, and ethylbenzene were detected in two samples, and 1,1-DCA, TCE, and 1,3-dichlorobenzene (1,3-DCE) were detected in one sample.

One or more of 18 SVOCs were detected in 50 samples from 13 of the 16 borings. SVOCs were detected in soils to depths of 15 feet.

A total of 25 samples were above the 95/95 STI for background metal concentrations in soils at NAS Alameda (PRC and JMM 1992a). However, for the same group of samples, only 10 occurrences in nine samples were above the expected range for native soils for manganese, copper, and lead (PRC and JMM 1992a). Total cyanide was detected in 5 of 69 soil samples that were analyzed.

Petroleum hydrocarbons were detected in the shallow groundwater well west of Building 616. Concentrations of 1,1-DCA and 1,2-DCE were detected in all four shallow groundwater wells located in the northern, western, and southern portion of the site.

One pesticide was detected in the groundwater sample from MWD13-1.

Twenty different metals in the four groundwater samples were detected above the 95/95 STI for background metal concentrations in groundwater at NAS Alameda (PRC and JMM 1992a).

Field activities performed under CTO 280 at Site 19 included CPT, HydroPunch sampling, shallow soil boring and monitoring well installation, deep monitoring well installation, quarterly groundwater sampling, and NPS sampling. Table 18-1 presents a summary of the field program. Figures 3-1 through 3-3 show sampling locations. Tables 3-2 through 3-9 summarize the field program, as well as analyses performed on soil and groundwater samples.

Cone Penetrometer Testing

Five CPT points (CPT-S19-01 through CPT-S19-05) were driven at Site 19, at locations shown on Figure 3-1. The objectives of the CPT program were to evaluate the lithology and hydrogeologic characteristics below a depth of 15 feet and to assess the thickness of the second water-bearing zone.

HydroPunch Sampling

Eight HydroPunch samples were obtained as shown on Figure 3-2. Four shallow HydroPunch samples (SHP-S19-05 and HP-S19-01 through HP-S19-03) were collected from the first water-bearing zone at Site 19. Four deep HydroPunch samples (DHP-S19-01 through DHP-S19-04) were collected from the second water-bearing zone. A listing of the chemical analyses performed on these samples is shown on Table 3-3.

Soil Sampling

Twelve soil samples were collected at Site 19 from three borings (B19-17, B19-18, and B19-19) and one monitoring well (M19-05). Soil boring locations are shown on Figure 3-1 and the monitoring well location is shown on Figure 3-2. A listing of the chemical analyses performed on these samples is shown on Table 3-5.

Shallow Monitoring Wells

One shallow monitoring well (M19-05) was installed east of the site in the first water-bearing zone at Site 19, at locations shown on Figure 3-2. Shallow monitoring well construction details are shown on Table 3-7.

Deep Monitoring Wells

One deep monitoring well (D19-01) was installed at Site 19, at locations shown on Figure 3-2. The location of the deep monitoring well at Site 19 was selected based on HydroPunch sampling results. Deep monitoring well construction details are shown on Table 3-8.

Groundwater Sampling

Groundwater monitoring well locations are shown on Figure 3-2. Four quarterly groundwater sampling events are scheduled for monitoring wells at Site 19. The fourth quarter of groundwater sampling for CTO 280 sites is scheduled for completion in August 1995.

Groundwater samples were collected from five shallow monitoring wells and three shallow HydroPunch locations, and from one deep monitoring well and five deep HydroPunch locations. Listings of HydroPunch analyses and first quarter groundwater sampling analyses are shown on Tables 3-3 and 3-6, respectively.

Non-Point Source Sampling

A total of two NPS sediment samples (NPS-S19-01 and NPS-S19-02) were collected from Site 19, at locations shown on Figure 3-3. A listing of chemical analyses performed on these samples is shown on Table 3-9.

Tables 18-2 through 18-5 present a summary of results of chemical analyses performed on soil and groundwater samples collected at Site 19. Quality control information related to these samples are shown on Table 18-6. A brief discussion of the results of chemical analyses are presented below. A complete listing of analytical results is presented as Attachment B (limited distribution).

Soil

- Analytical results for organic chemical analyses performed on soil samples are shown on Table 18-2; locations are shown on Figure 3-1.
- Elevated levels of TPH-E were detected in the surface soil sample collected from west of Site 19. Lower levels of TPH-E as motor oil were detected in two samples, and TPH-P was detected in one sample collected from the surface west of Site 19.

Groundwater - Shallow Zone

- Analytical results for organic chemical analyses performed on groundwater samples are shown on Table 18-4; locations are shown on Figure 3-2.
- Solvent-related VOCs were detected in monitoring wells located north, west, and south of the site.
- Petroleum hydrocarbon-related VOCs were detected in groundwater samples collected south and east of the site, in monitoring wells MWD13-4 and M19-05.
- TPH-E as motor oil was detected in all monitoring wells surrounding the site. TPH-E as motor oil was detected in all four shallow HydroPunch samples collected.
- TPH-P was detected in two shallow HydroPunch samples located in the center of the site.
- Four metals exceeded the 95/95 STI in three of the five groundwater samples collected. Metals exceeding the 95/95 STI are shown on Table 18-3.
- TDS levels ranged from 335 mg/L to 3,300 mg/L.

Groundwater - Deep Zone

- Analytical results for organic chemical analyses performed on groundwater samples are shown on Table 18-3; locations are shown on Figure 3-2.
- Solvent-related VOCs were detected west and south of the site.
- TPH-E as motor oil was detected in deep HydroPunch samples collected northwest, southwest, and south of the site.
- TDS levels in the deep HydroPunch samples ranged from 630 mg/L to 14,000 mg/L.

Non-Point Source Samples

- Analytical results for organic chemical analyses performed on NPS samples are shown on Table 18-5; locations are shown on Figure 3-3.
- TPH-E as motor oil was detected in sample NPS-S19-01, which was collected southwest of the site.
- Three solvent-related VOCs and two SVOCs (1,2-dichlorobenzene and bis(2-ethylhexyl)phthalate) were detected in sample NPS-S19-02, which was collected northeast of Site 19.

18.6 SUMMARY OF SITE CHARACTERIZATION

Based on the review of the data, it is concluded that:

- The compounds detected in soil and shallow groundwater are similar in nature to those found during previous investigations.
- The extent of potential chemicals of interest in the soil and groundwater appears to have been adequately characterized for the purpose of conducting an RI/FS. If a human health or environmental risk is defined during the risk assessment, the need for additional investigation will be evaluated.

SECTION 19.0

19.0 SITES 4, 5, AND 10A (NON-CTO 280 SITES)

Follow-on field work was originally conducted at Sites 4, 5 and 10A during the winter and spring of 1994, as part of CTO 260, and is summarized in the CTO 260 Data Transmittal Memorandum (PRC and Montgomery Watson 1995). The purpose of the current field work and sampling at these sites was to address data gaps which were noted after review of analytical and hydrogeologic results from the winter and spring 1994 field investigation, taking advantage of the fact that field investigation activities were currently underway as part of CTO 280.

Additional work conducted at Site 4 included three shallow soil borings and one CPT. Additional work conducted at Site 5 included the installation of two shallow monitoring wells, the installation of three piezometers, four CPTs, four deep HydroPunch, two shallow HydroPunch, and five shallow GeoProbes. Additional work conducted at Site 10A included the installation of two piezometers, one CPT, and two shallow HydroPunch.

A description of the fieldwork conducted at the three sites during the current investigation, and analytical results, are included in this document as Attachment A. Attachment A also contains concentration contour maps showing VOCs that were detected in groundwater during the July 1994 sampling event for Site 5, and during the September 1994 sampling event for Site 4.

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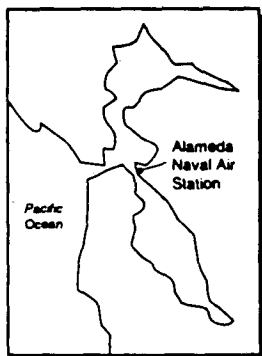
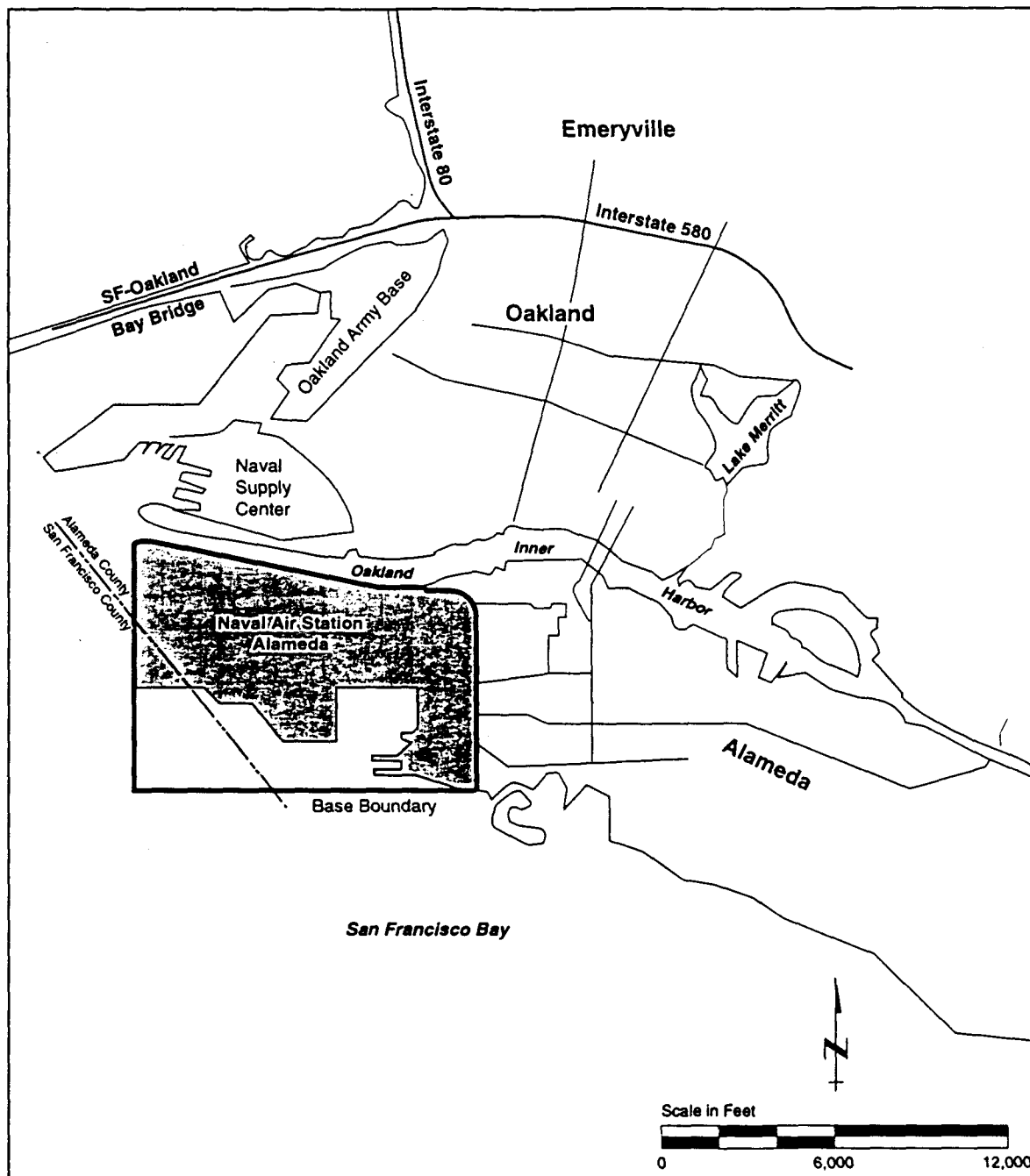
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FIGURES



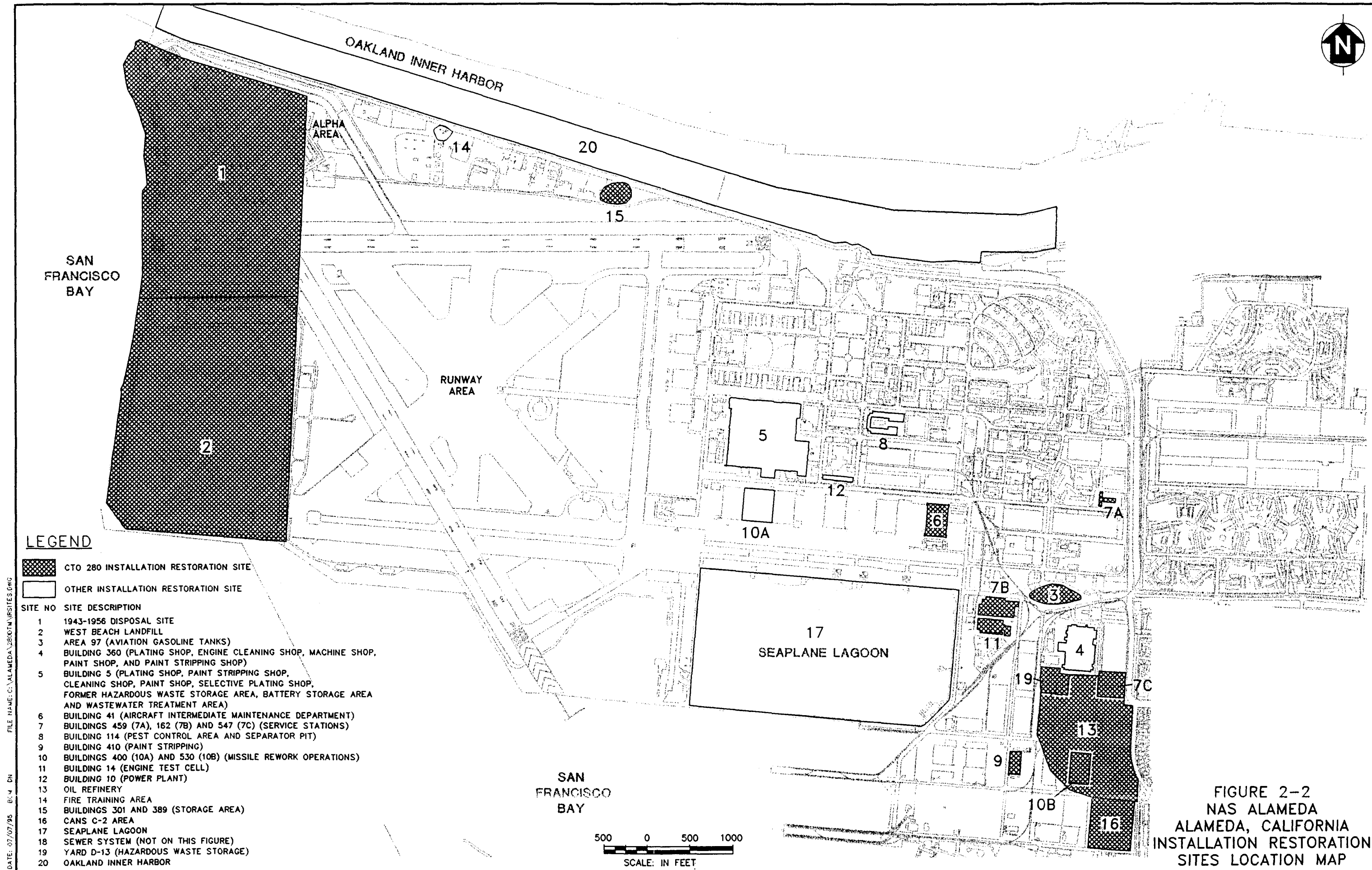
NAVAL AIR STATION ALAMEDA
ALAMEDA, CALIFORNIA

LOCATION MAP

FIGURE 2-1

Source: Modified from CA State Automobile Assoc. map, Oakland/Berkeley/Alameda. Copyright 1980, revised 1989.

AL-1

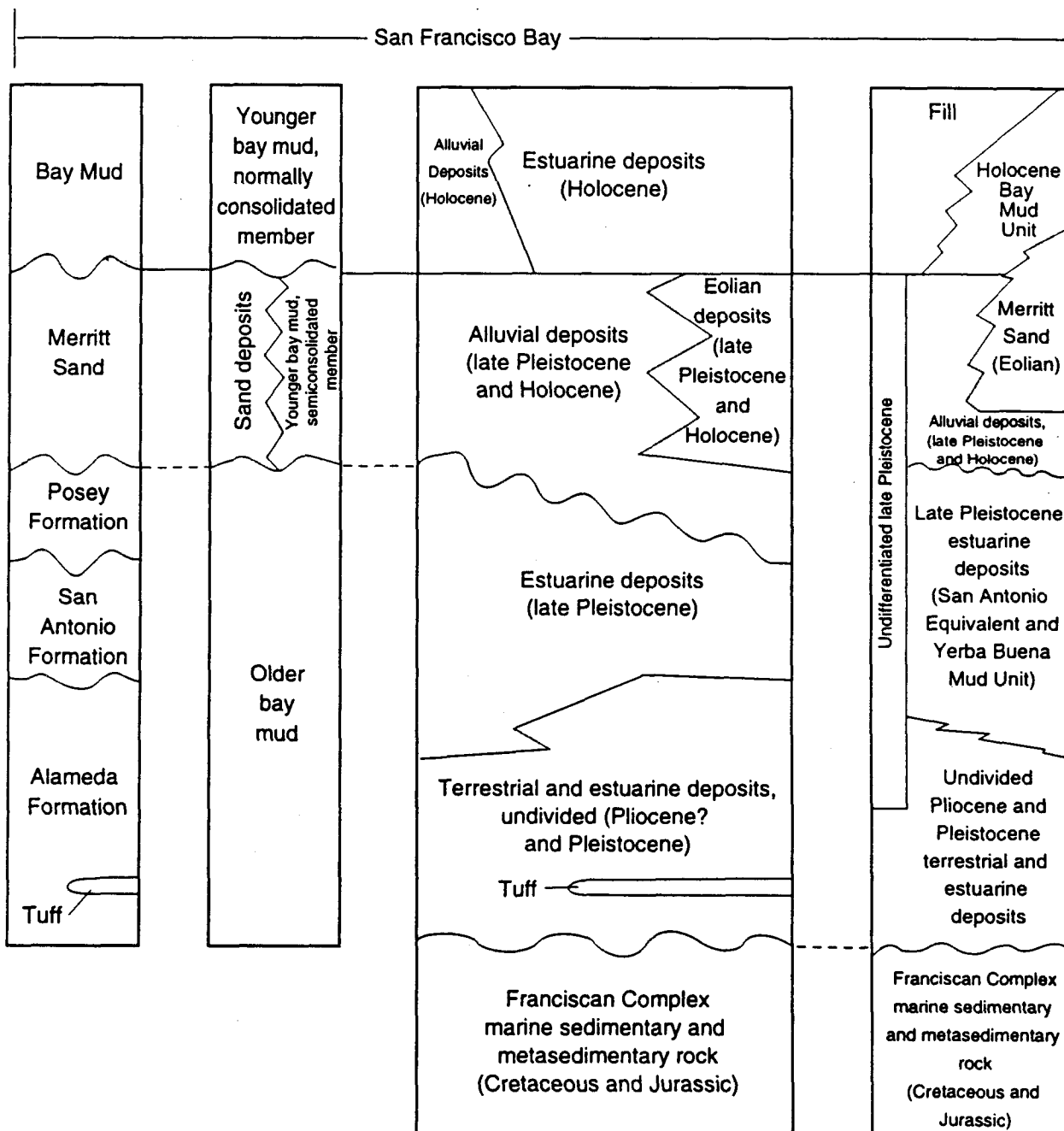


Trask and
Rolston (1951)

Treasher
(1963, p.24)

Atwater et al.,
1977

This Document



NAVAL AIR STATION ALAMEDA
ALAMEDA, CALIFORNIA
IDEALIZED STRATIGRAPHIC COLUMN
FOR ALAMEDA AREA

FIGURE 2-3

SAN FRANCISCO BAY

OAKLAND INNER HARBOR

ALPHA AREA

SEAPLANE LAGOON

SAN FRANCISCO BAY

- LEGEND**
- SHALLOW MONITORING WELL LOCATION
 - ELEVATION OF GROUNDWATER TABLE RELATIVE TO MEAN LOW LOW WATER (MLLW)
 - CONTOUR INTERVAL REFERENCES LINE OF EQUAL GROUNDWATER ELEVATION
 - CONTOUR INTERVAL = 0.5 FT
 - INSTALLATION RESTORATION SITE BOUNDARY

NOTES:

GROUNDWATER LEVELS IN WELLS ARE TIDALLY INFLUENCED AT SITES 1, 2 AND THE RUNWAY AREA. GROUNDWATER GRADIENT AND FLOW DIRECTION WILL VARY WITH THE TIDAL CYCLE. THIS EFFECT IS MOST PRONOUNCED IN WELLS CLOSEST TO THE SAN FRANCISCO BAY AND OAKLAND INNER HARBOR.

THIS MAP REPRESENTS ELEVATIONS OF WELLS SCREENED AT THE TOP OF THE FIRST WATER-BEARING ZONE ("A-ZONE" WELLS) IN THE WESTERN PORTION OF THE BASE (SITES 1, 2 AND THE RUNWAY AREA); AND WELLS SCREENED IN THE FIRST WATER-BEARING ZONE EAST OF THE RUNWAY AREA.

SCALE: IN FEET

FIGURE 2-4
NAS ALAMEDA
ALAMEDA, CALIFORNIA
GROUNDWATER CONTOUR MAP
FIRST WATER-BEARING ZONE
"A-ZONE" WELLS
MEASURED JANUARY 5, 1995

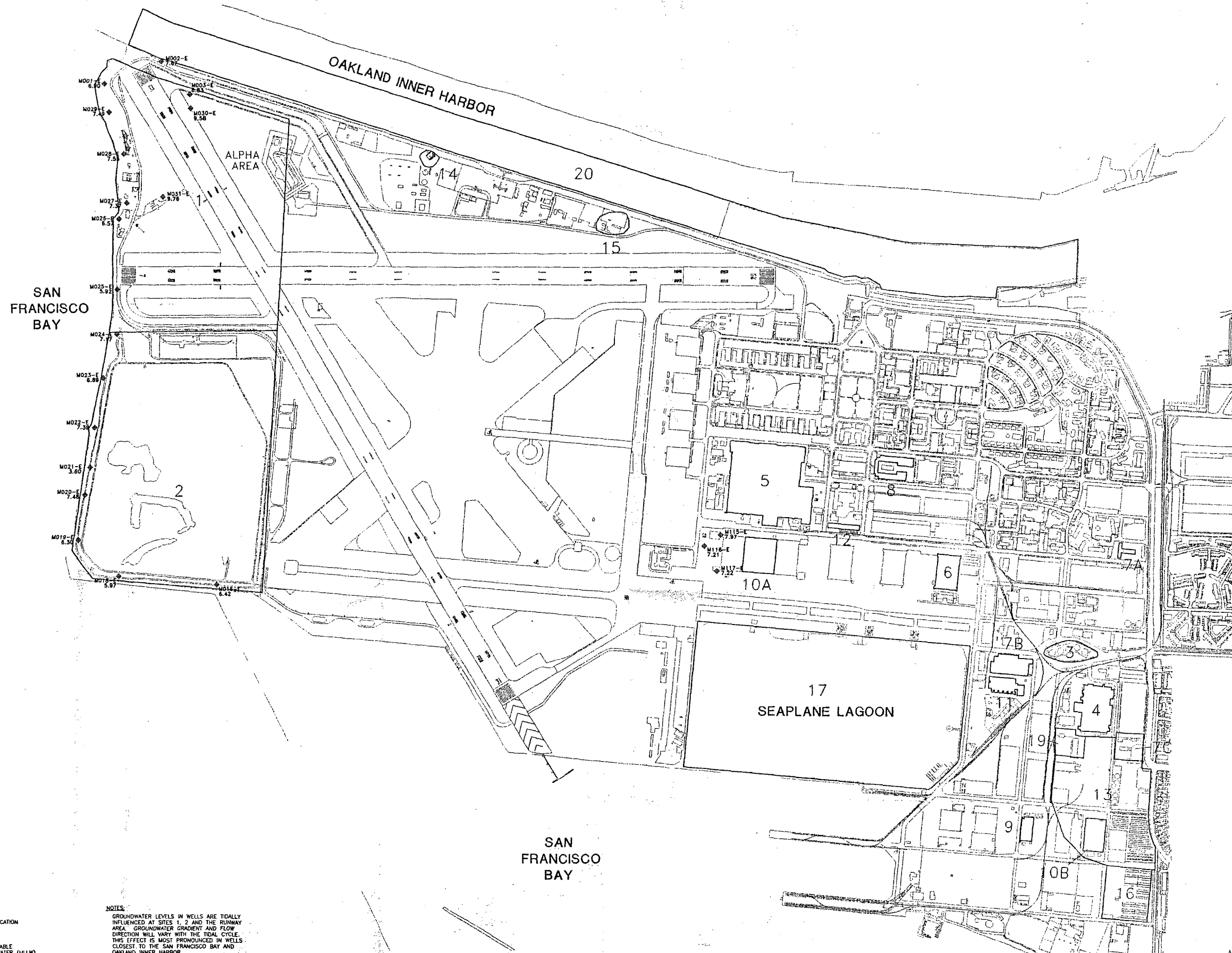


FIGURE 2-5
NAS ALAMEDA
ALAMEDA, CALIFORNIA
GROUNDWATER ELEVATION MAP
FIRST WATER-BEARING ZONE
"E-ZONE" WELLS
MEASURED JANUARY 1995

SAN FRANCISCO BAY

OAKLAND INNER HARBOR

SAN FRANCISCO BAY

SEAPLANE LAGOON

ALPHA AREA

20

15

10A

17

0B

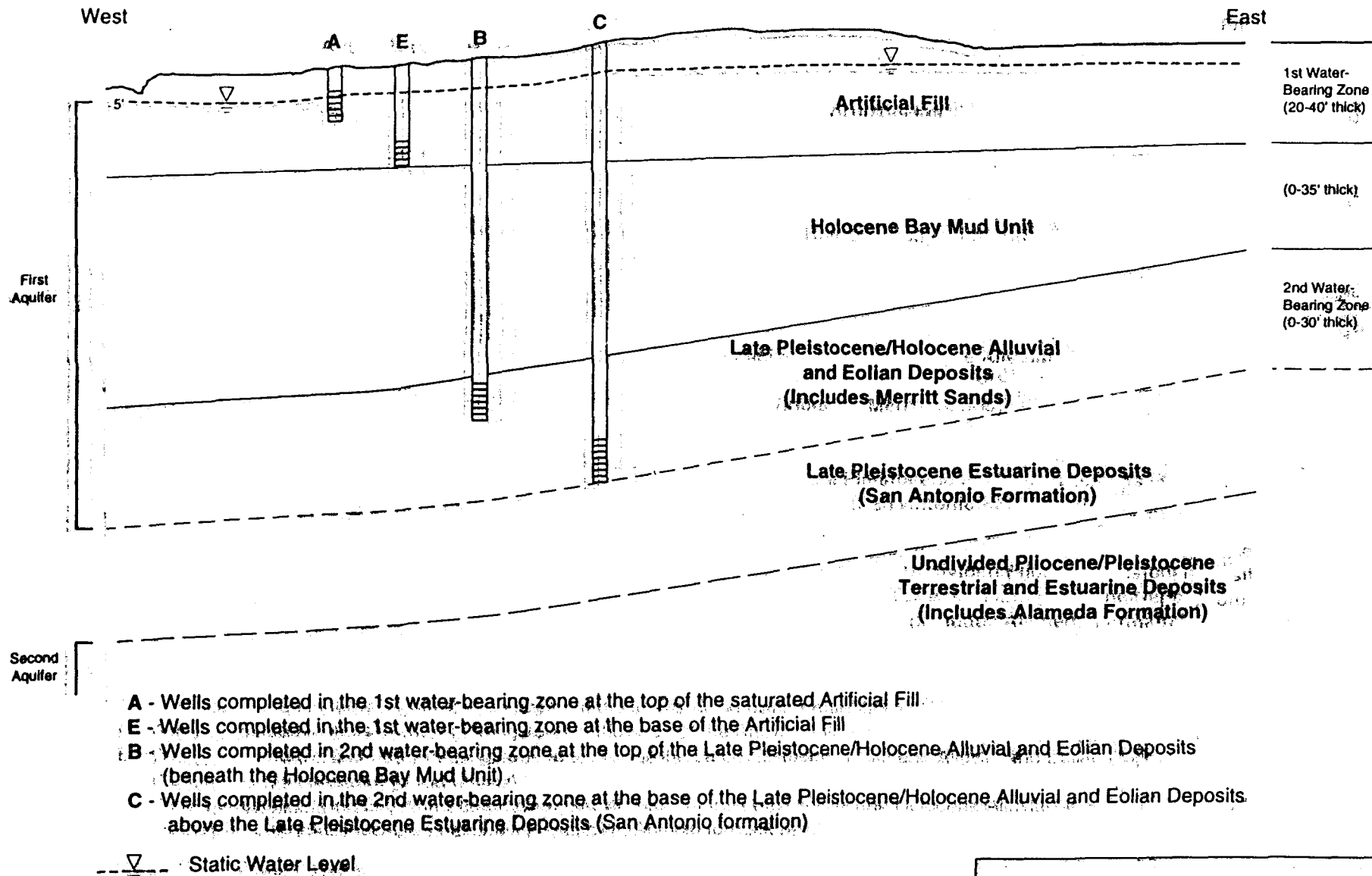
16

- DEEP MONITORING WELL LOCATION
- ELEVATION OF GROUNDWATER TABLE
RELATIVE TO MEAN LOW LOW WATER (MLLW)
- CONTOUR INTERVAL REFERENCES LINE
OF EQUAL GROUNDWATER ELEVATION
CONTOUR INTERVAL = 0.5 FT
- 2 INSTALLATION RESTORATION SITE BOUNDARY

NOTES:
GROUNDWATER LEVELS IN WELLS ARE TIDALLY
INFLUENCED AT SITES 1, 2 AND THE RUNWAY
AREA. GROUNDWATER GRADIENT AND FLOW
DIRECTION WILL VARY WITH THE TIDAL CYCLE.
THIS EFFECT IS MOST PRONOUNCED IN WELLS
CLOSEST TO THE SAN FRANCISCO BAY AND
OAKLAND INNER HARBOR.
DUE TO THE ABSENCE OF A BAY MUD LAYER
AT SITES 7C, 10B, 13, 16, & 19, A SECOND
WATER-BEARING ZONE TECHNICALLY DOES NOT
EXIST. HOWEVER, DEEP WELLS AT THESE SITES
WERE SCREENED AT THE SAME DEPTH AS OTHER
WELLS EAST OF THE RUNWAY AREA.

250 0 250 500
SCALE IN FEET

FIGURE 2-6
NAS ALAMEDA
ALAMEDA, CALIFORNIA
GROUNDWATER CONTOUR MAP
SECOND WATER-BEARING ZONE
MEASURED JANUARY 5, 1995

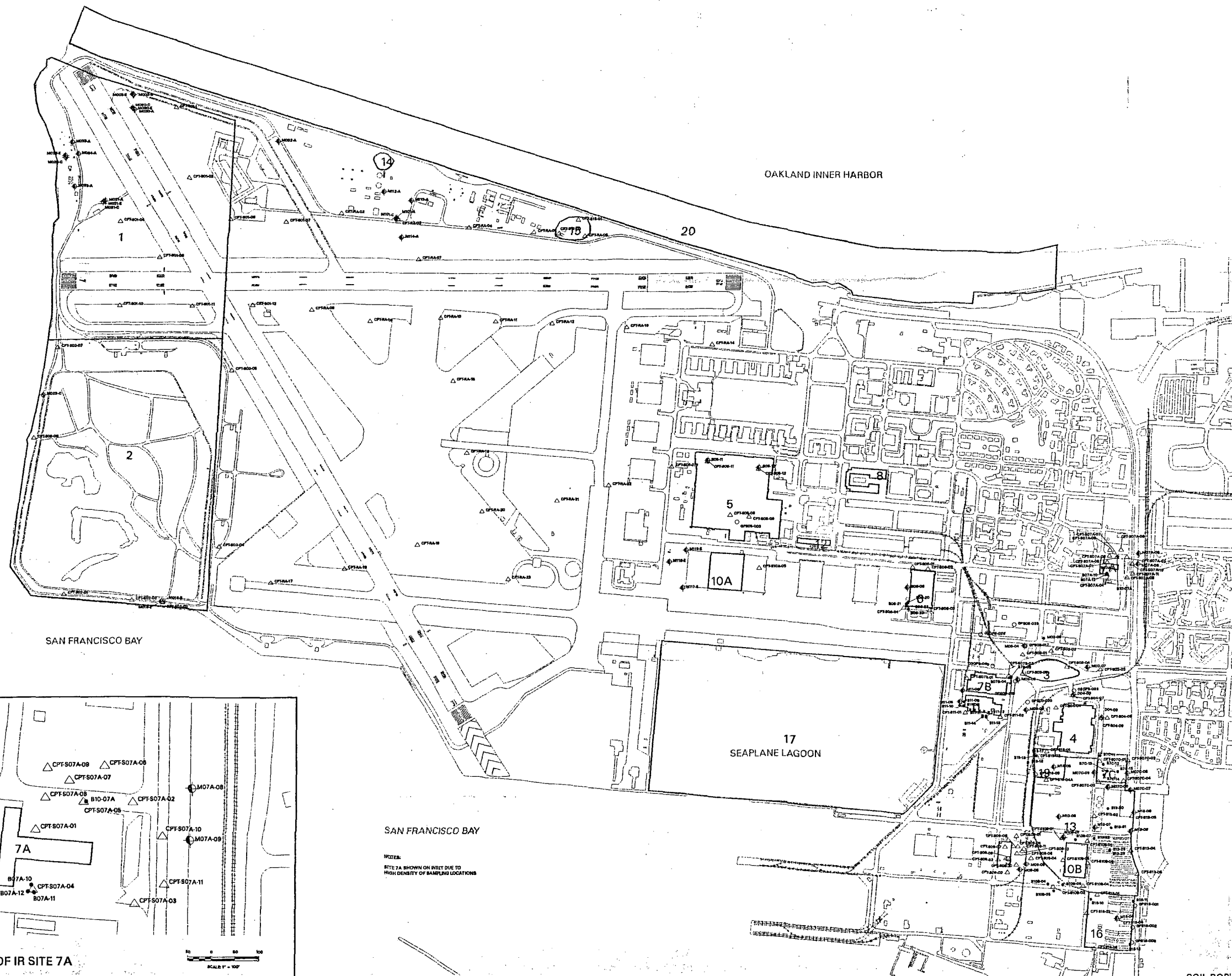


NAVAL AIR STATION ALAMEDA
ALAMEDA, CALIFORNIA
SCHEMATIC DIAGRAM OF
WELL TYPE AND PLACEMENT

FIGURE 2-7

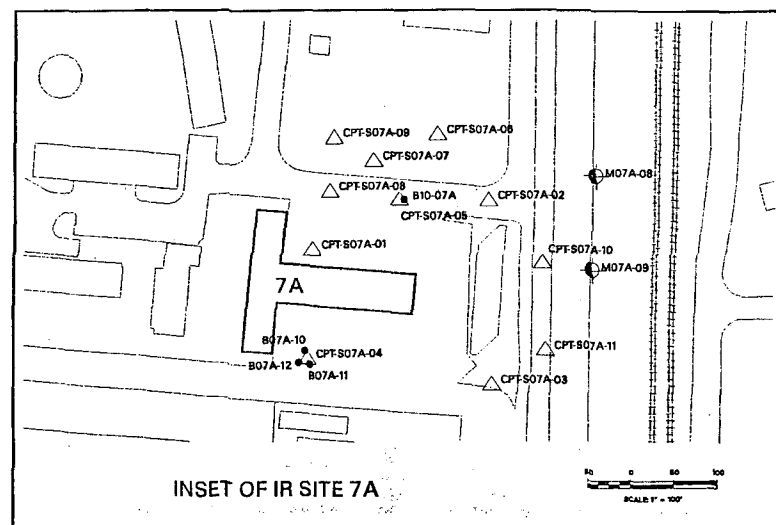
Not to scale
This is a schematic representation of the stratigraphic units underlying Sites 1 and 2 and the Runway Area

CTO107/A-8



LEGEND

- ◆ SOIL BORING WITH MONITORING WELL INSTALLATION IN FIRST WATER BEARING ZONE (INSTALLED AUGUST-DECEMBER 1994)
- ◆ SOIL BORING WITH MONITORING WELL INSTALLATION IN SECOND WATER BEARING ZONE (INSTALLED OCTOBER-NOVEMBER 1994)
- SHALLOW SOIL BORING (DRILLED AUGUST-DECEMBER 1994)
- △ CPT LOCATION (ADVANCED AUGUST-DECEMBER 1994)
- GEOPROBE SOIL SAMPLE LOCATION
- 4 INSTALLATION RESTORATION SITE BOUNDARY

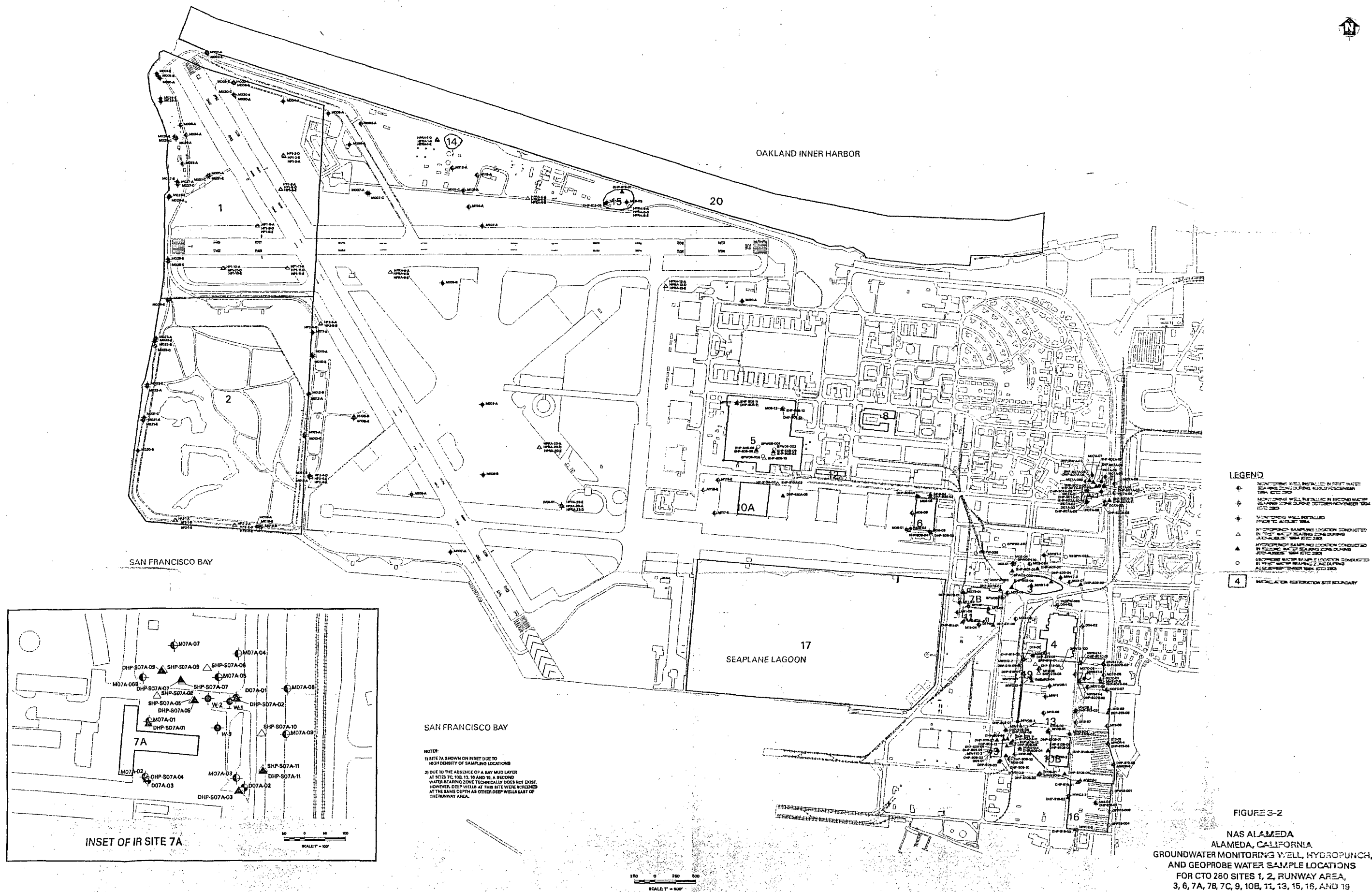


SAN FRANCISCO BAY

NOTE:
SITE 7A SHOWN ON INSET DUE TO
HIGH DENSITY OF SAMPLING LOCATIONS

250 0 250 500
SCALE 1" = 500'

FIGURE 3-1
NAS ALAMEDA
ALAMEDA, CALIFORNIA
SOIL BORING, CPT ADVANCEMENT, AND GEOPROBE
SOIL SAMPLE LOCATIONS FOR CTO 280 SITES
1, 2, RUNWAY AREA, 3, 6, 7A, 7B, 7C,
9, 10B, 11, 13, 15, 16, AND 19



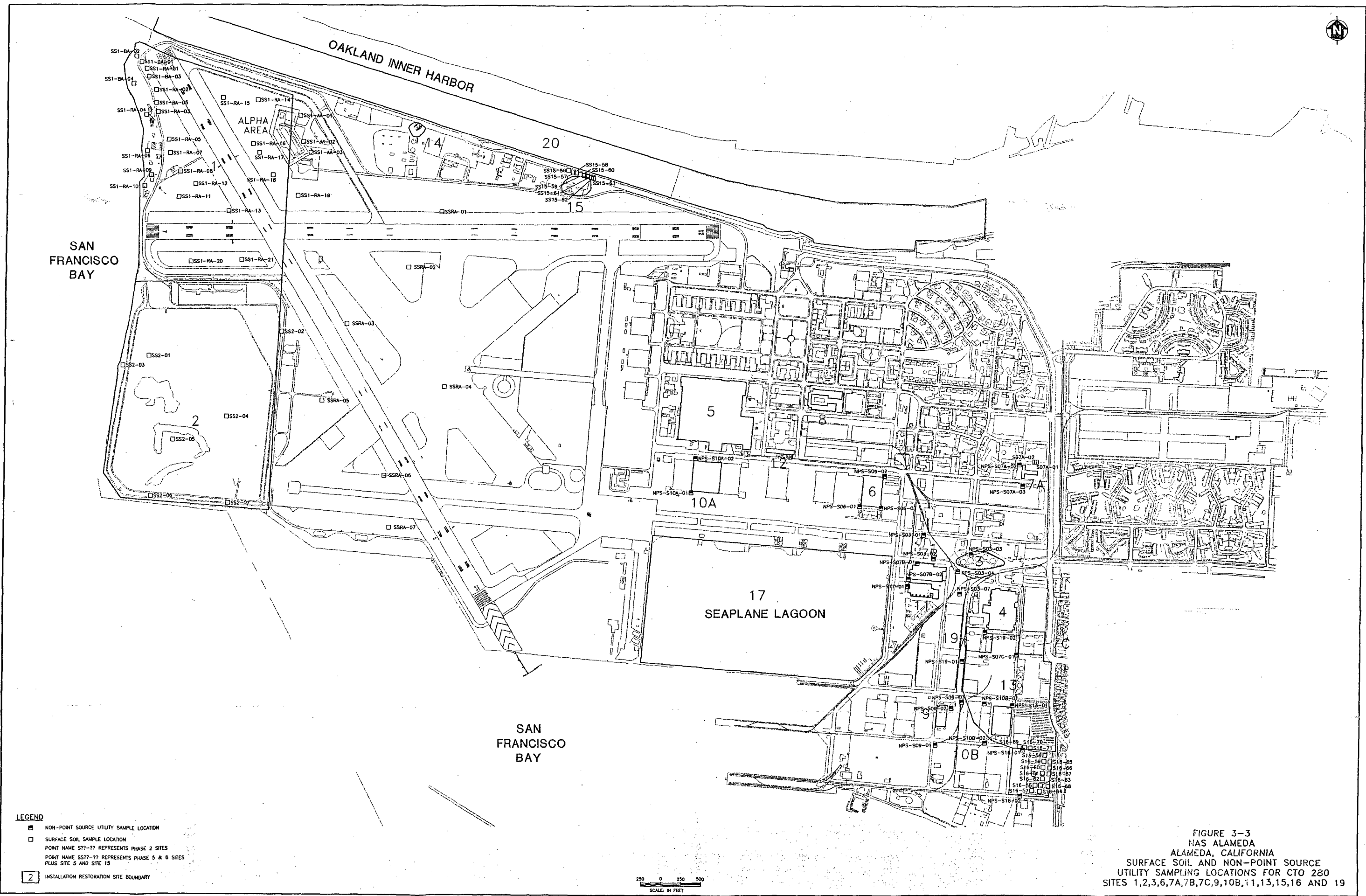
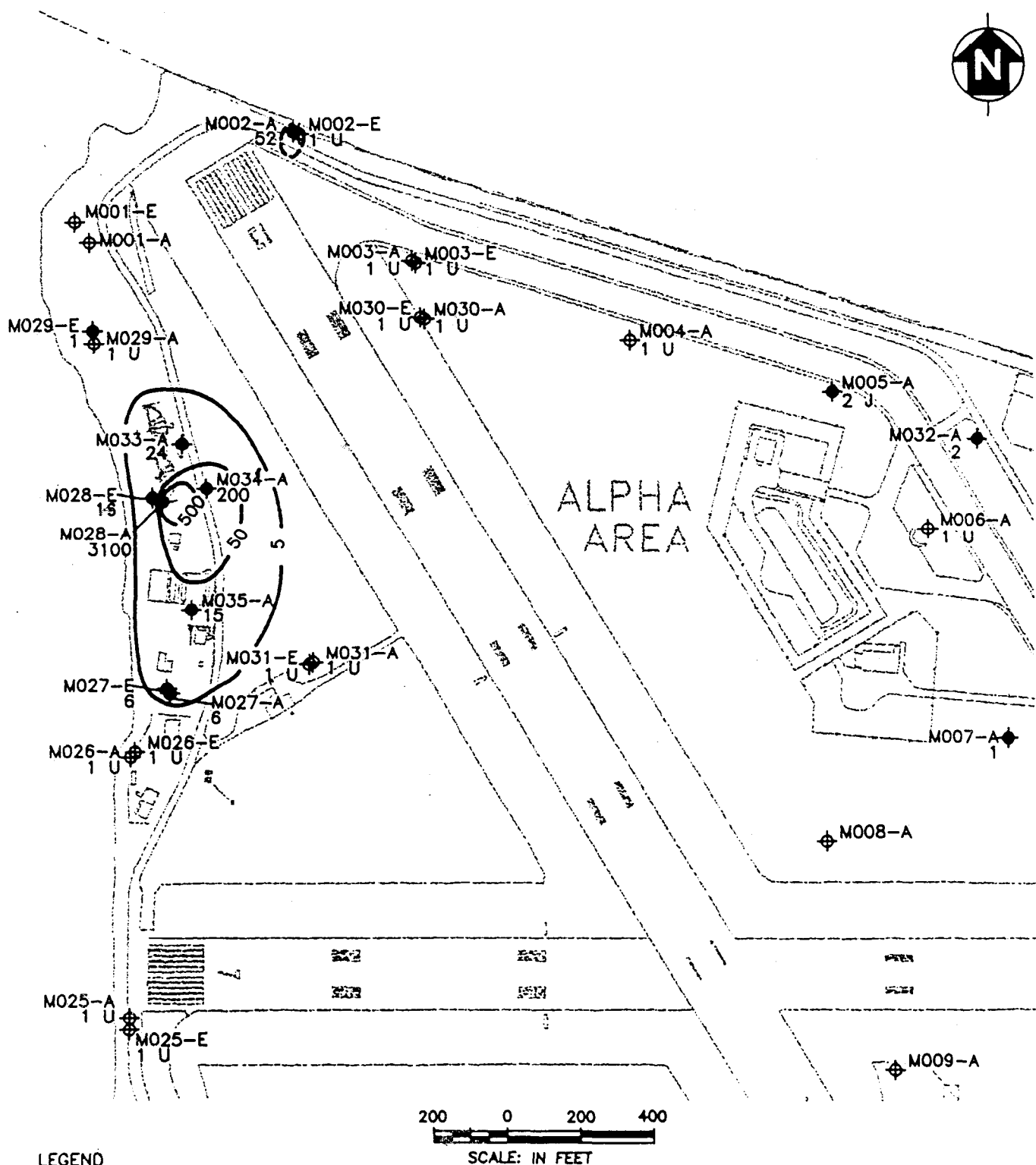


FIGURE 3-3
NAS ALAMEDA
ALAMEDA, CALIFORNIA
SURFACE SOIL AND NON-POINT SOURCE
UTILITY SAMPLING LOCATIONS FOR CTO 280
SITES 1,2,3,6,7A,7B,7C,9,10B,11,13,15,16 AND 19



LEGEND

◆ FIRST WATER-BEARING ZONE
MONITORING WELL LOCATION

◆ FIRST WATER-BEARING ZONE
MONITORING WELL LOCATION
CHEMICAL CONCENTRATION
ABOVE LOWER DETECTION LIMIT

— 100 — 1,2-DICHLOROETHENE ISOCONTOUR

NOTES: CALIFORNIA MAXIMUM CONTAMINANT LEVEL = 6 µg/L
ALL CONCENTRATIONS IN µg/L

FIGURE 5-1
NAS ALAMEDA
ALAMEDA, CALIFORNIA
SITE 1 CONCENTRATION CONTOURS OF
1,2-DICHLOROETHENE IN GROUNDWATER
FIRST WATER-BEARING ZONE
SEPTEMBER-OCTOBER 1994

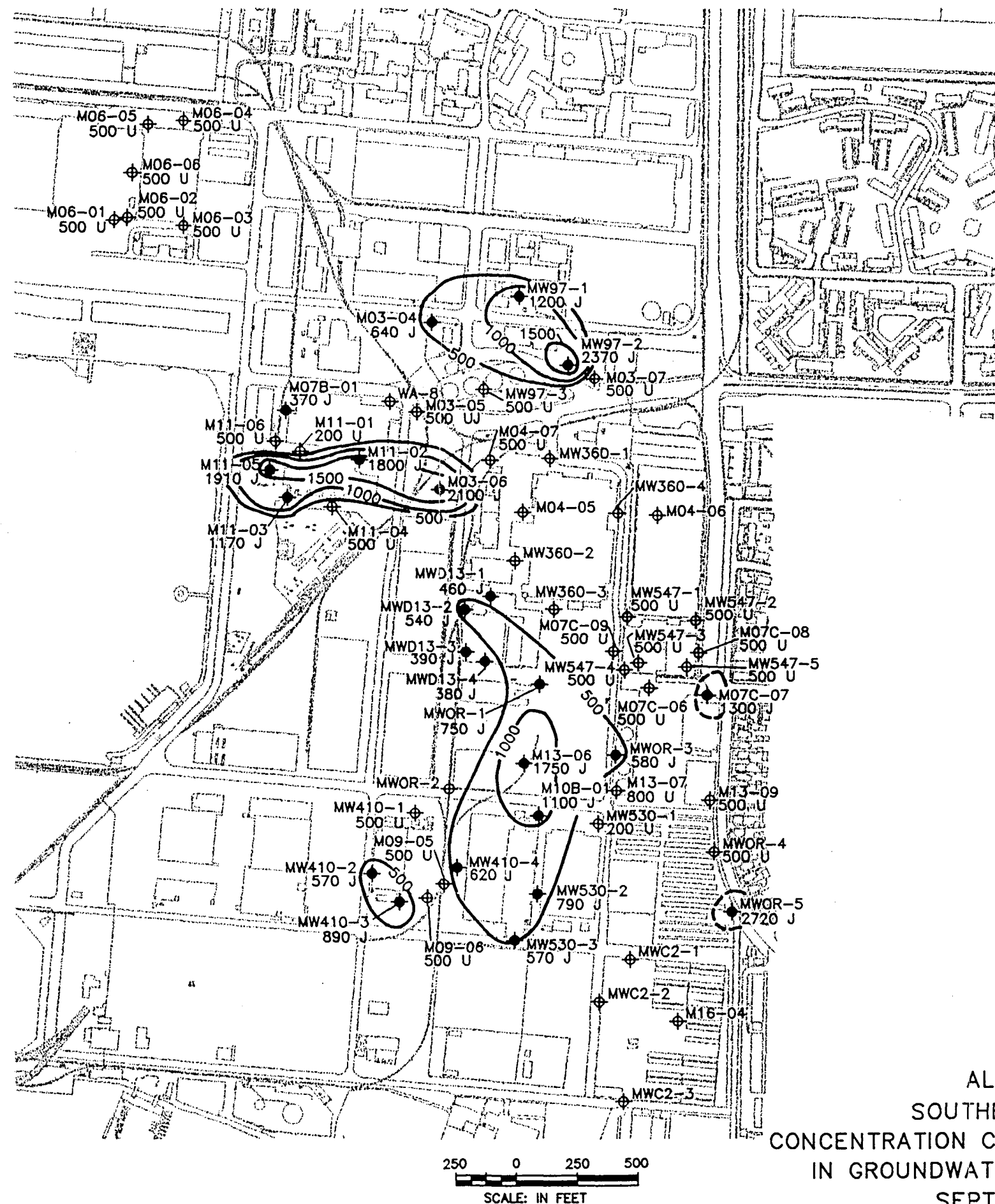
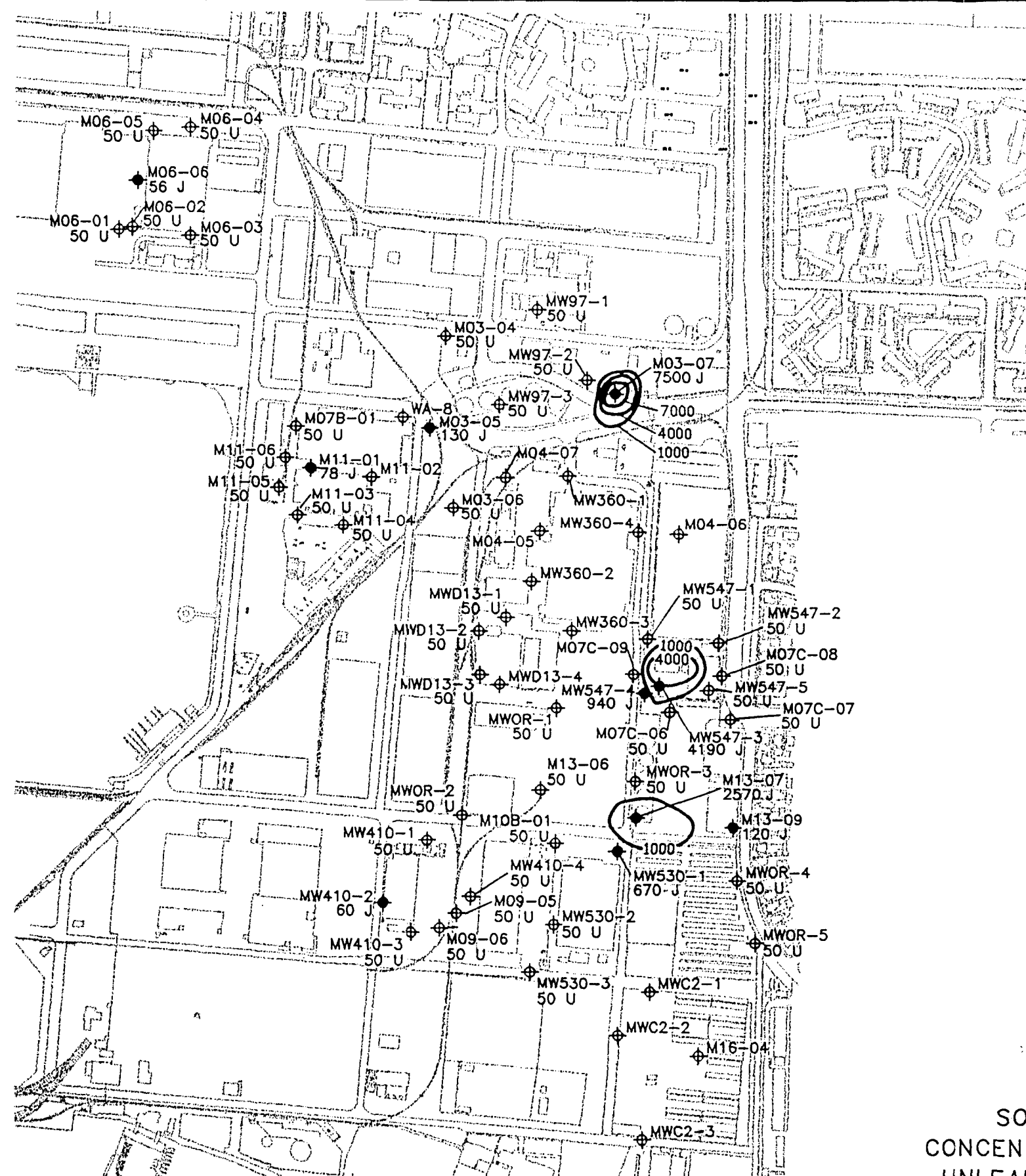


FIGURE 8-1
NAS ALAMEDA
ALAMEDA, CALIFORNIA
SOUTHEAST PORTION OF BASE
CONCENTRATION CONTOURS OF TPH-E AS MOTOR OIL
IN GROUNDWATER FIRST WATER-BEARING ZONE
SEPTEMBER-OCTOBER 1994

FILE NAME: E:\ALAMEDA\CONTOUR\28001\DWG\ALVOCQ1.DWG
DATE: 06/26/95 BCN DN



LEGEND

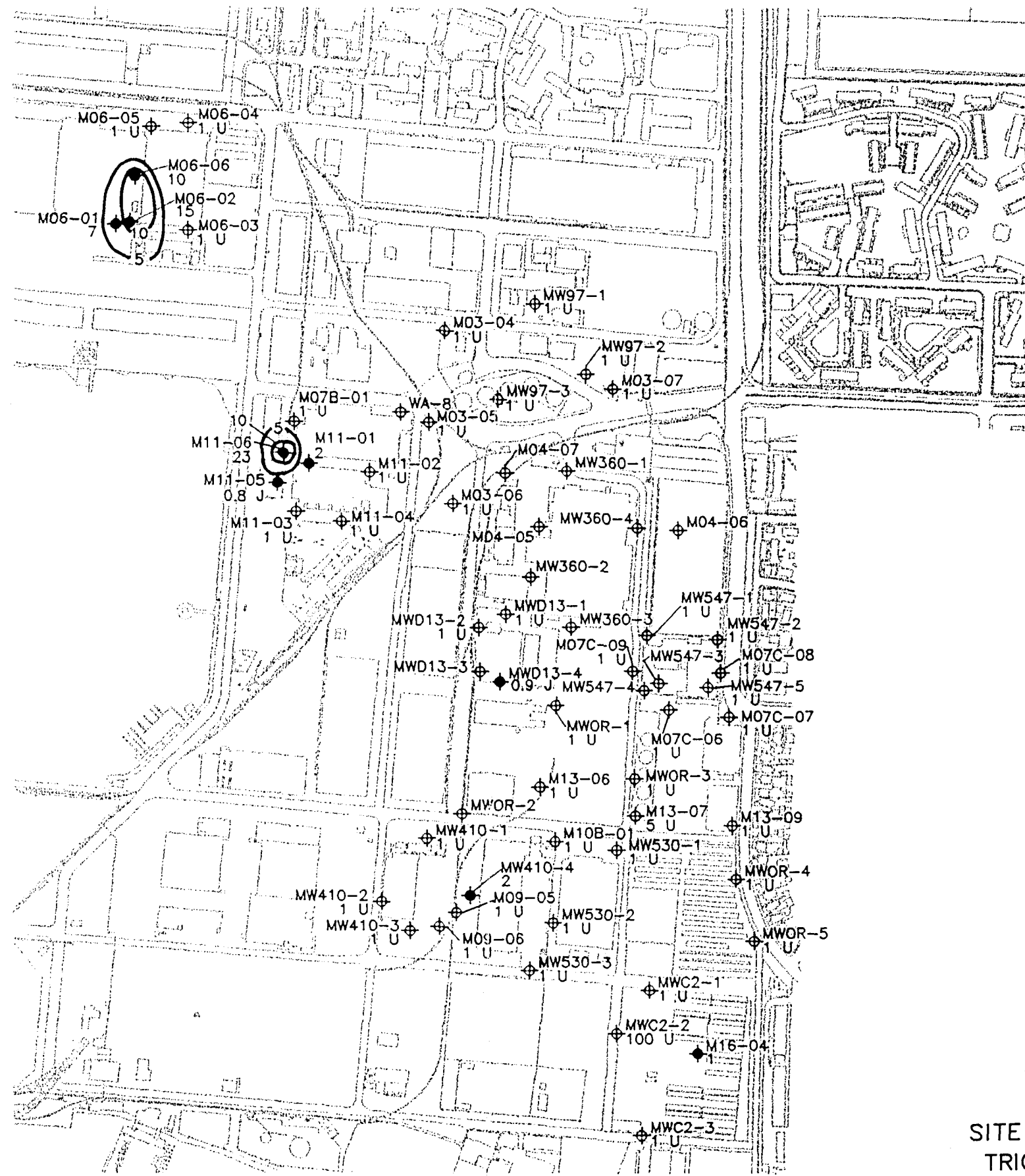
- ⊕ FIRST WATER-BEARING ZONE MONITORING WELL LOCATION
- ◆ FIRST WATER-BEARING ZONE MONITORING WELL LOCATION CHEMICAL CONCENTRATION ABOVE LOWER DETECTION LIMIT

—1000— TPH-E AS GASOLINE ISOCONTOUR

NOTE: ALL CONCENTRATIONS IN $\mu\text{g/L}$

250 0 250 500
SCALE: IN FEET

FIGURE 8-2
NAS ALAMEDA
ALAMEDA, CALIFORNIA
SOUTHEAST PORTION OF BASE
CONCENTRATION CONTOURS OF TPH-P AS
UNLEADED GASOLINE IN GROUNDWATER
FIRST WATER-BEARING ZONE
SEPTEMBER-OCTOBER 1994



LEGEND

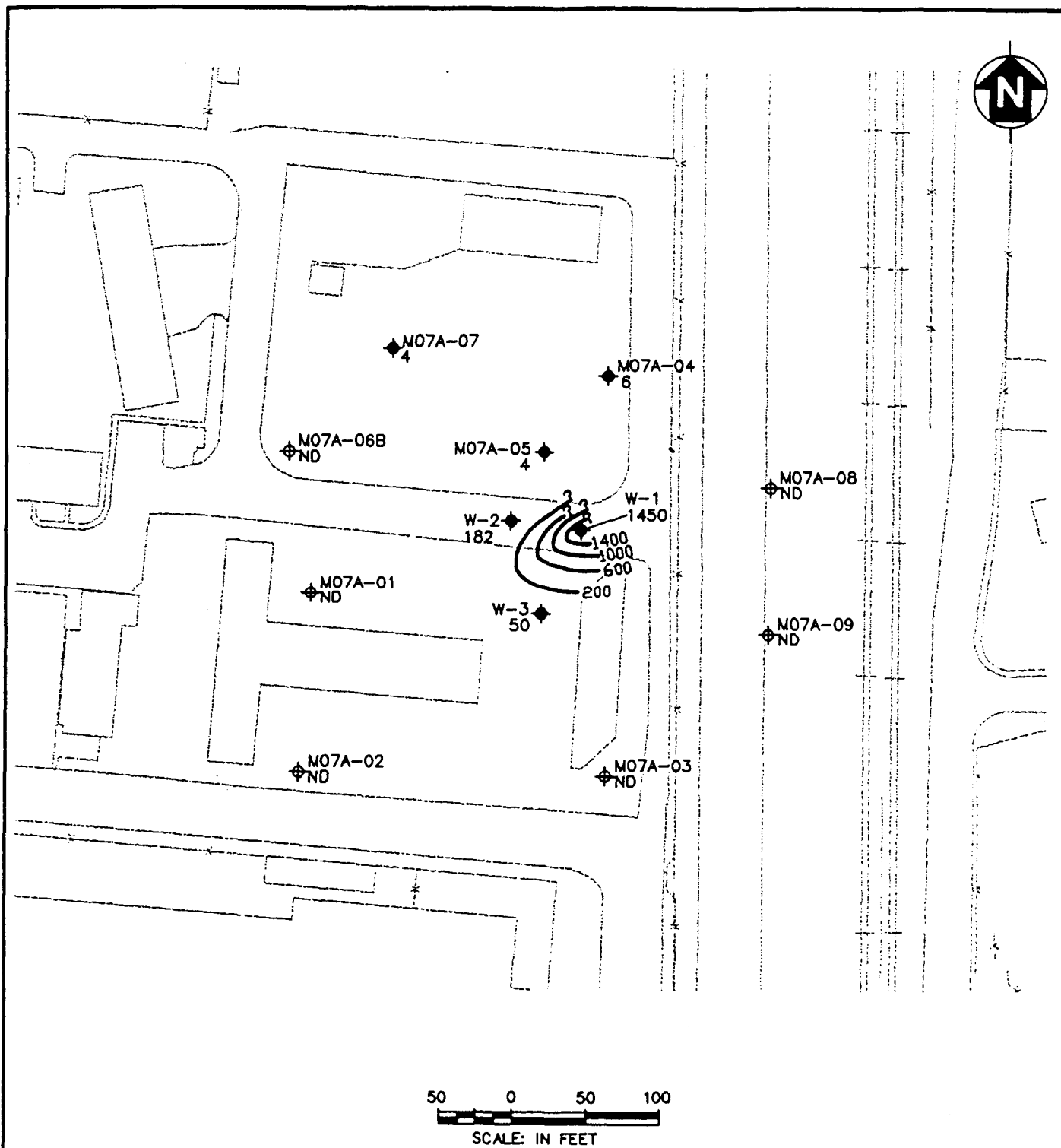
- ⊕ FIRST WATER-BEARING ZONE
MONITORING WELL LOCATION
- ◆ FIRST WATER-BEARING ZONE
MONITORING WELL LOCATION
CHEMICAL CONCENTRATION
ABOVE LOWER DETECTION LIMIT

— 10 — TRICHLOROETHENE ISOCONTOUR

NOTES: CALIFORNIA MAXIMUM CONTAMINANT LEVEL = $5\mu\text{g/L}$
ALL CONCENTRATIONS IN $\mu\text{g/L}$

250 0 250 500
SCALE: IN FEET

FIGURE 9-1
NAS ALAMEDA
ALAMEDA, CALIFORNIA
SITE 6 CONCENTRATION CONTOURS OF
TRICHLOROETHENE IN GROUNDWATER
IN FIRST WATER-BEARING ZONE
SEPTEMBER-OCTOBER 1994



LEGEND

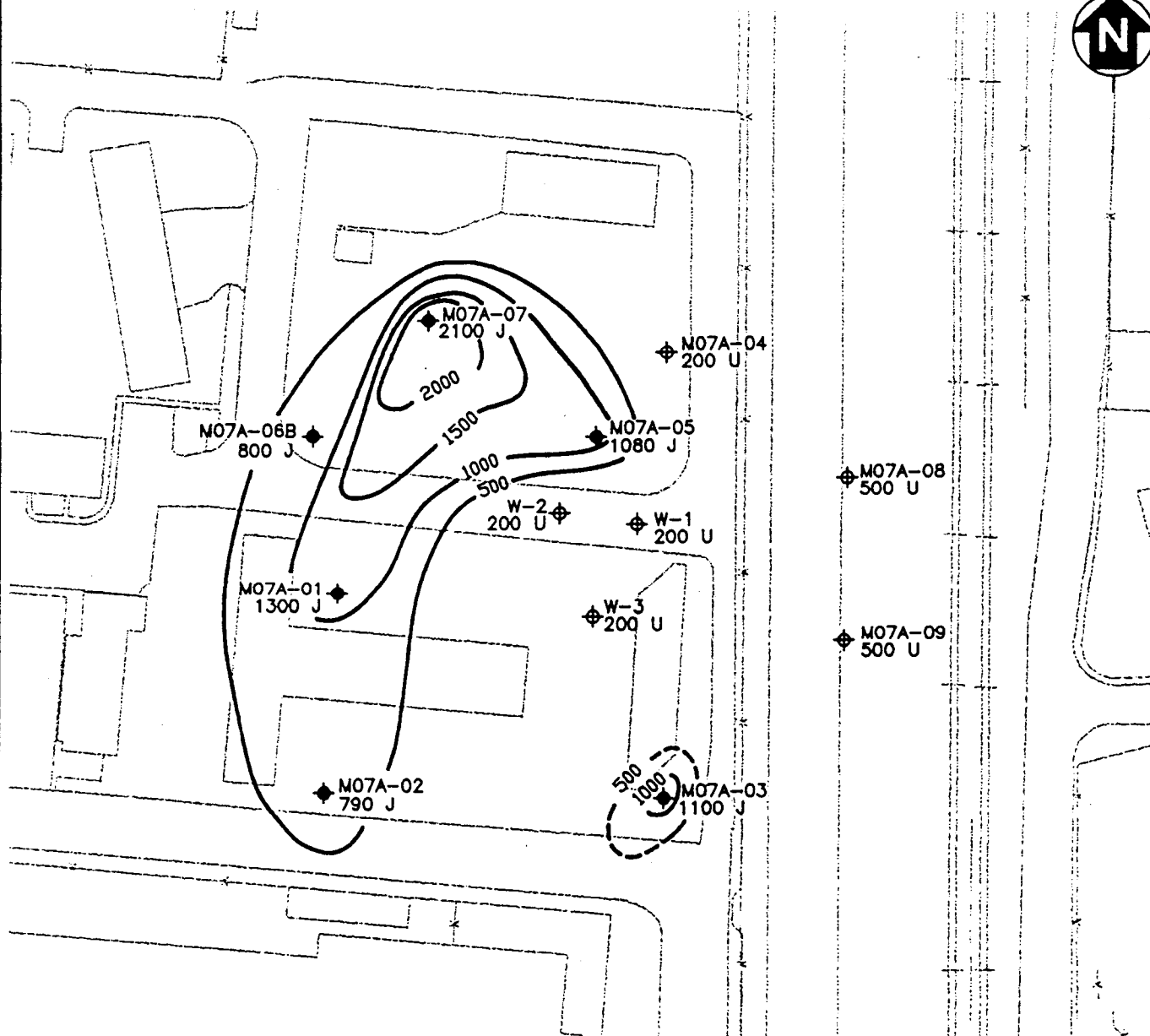
- ⊕ FIRST WATER-BEARING ZONE MONITORING WELL LOCATION
- ◆ FIRST WATER-BEARING ZONE MONITORING WELL LOCATION CHEMICAL CONCENTRATION ABOVE LOWER DETECTION LIMIT
- ND NOT DETECTED
- 1000— BTEX ISOCONTOUR

ND NOT DETECTED

—1000— BTEX ISOCONTOUR

NOTES: ALL CONCENTRATIONS IN $\mu\text{g/L}$
BTEX—BENZENE, TOLUENE, ETHYLBENZENE, XYLENE

FIGURE 10-1
NAS ALAMEDA
ALAMEDA, CALIFORNIA
SITE 7A CONCENTRATION CONTOURS
OF BTEX IN GROUNDWATER
FIRST WATER-BEARING ZONE
SEPTEMBER-OCTOBER 1994



50 0 50 100
SCALE: IN FEET

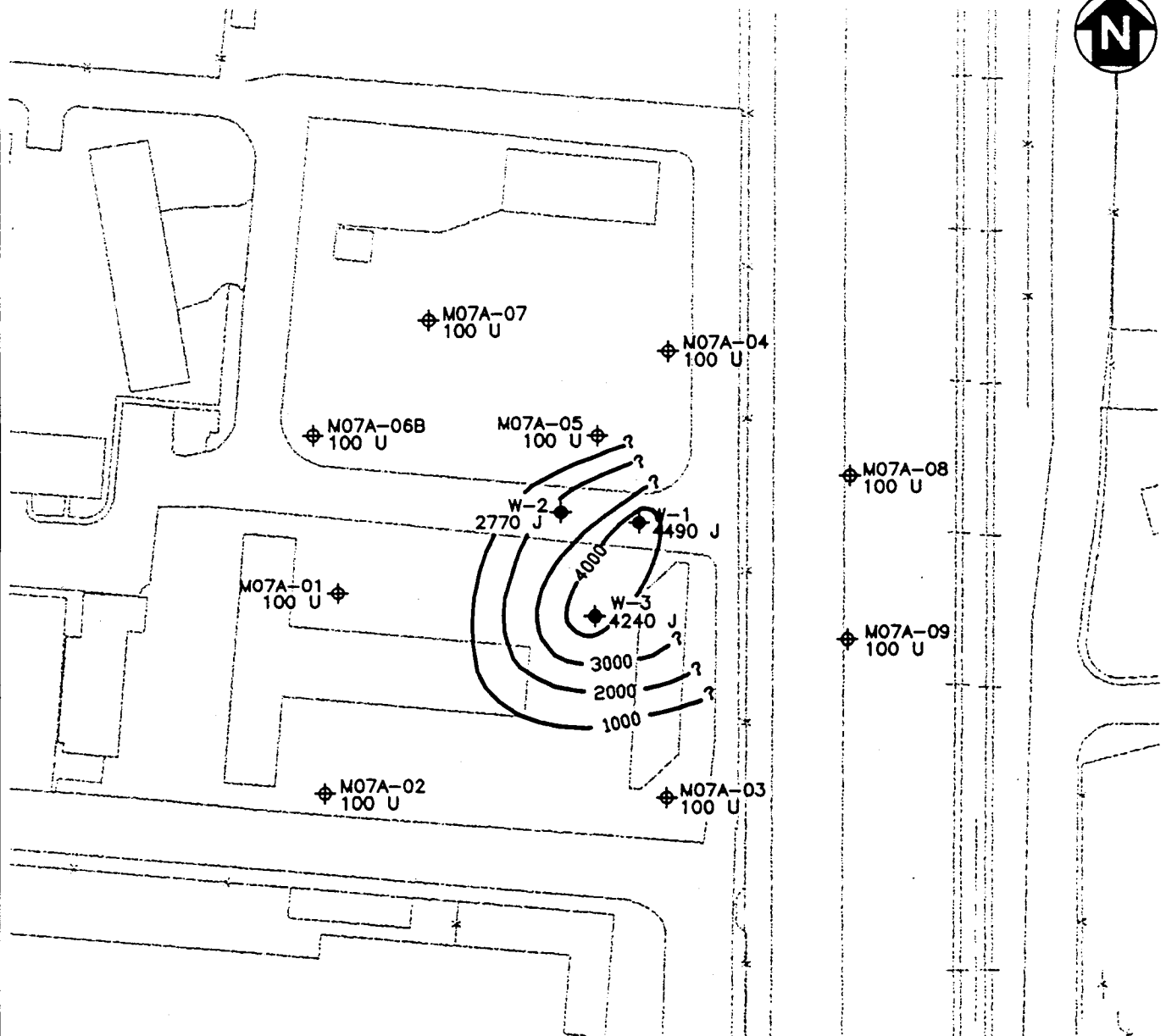
LEGEND

- ⊕ FIRST WATER-BEARING ZONE MONITORING WELL LOCATION
- ◆ FIRST WATER-BEARING ZONE MONITORING WELL LOCATION CHEMICAL CONCENTRATION ABOVE LOWER DETECTION LIMIT

— 500 — TPH-E AS MOTOR OIL ISOCONTOUR

NOTE: ALL CONCENTRATIONS IN µg/L

FIGURE 10-2
NAS ALAMEDA
ALAMEDA, CALIFORNIA
SITE 7A CONCENTRATION CONTOURS OF
TPH-E AS MOTOR OIL IN GROUNDWATER
FIRST WATER-BEARING ZONE
SEPTEMBER-OCTOBER 1994



50 0 50 100
SCALE: IN FEET

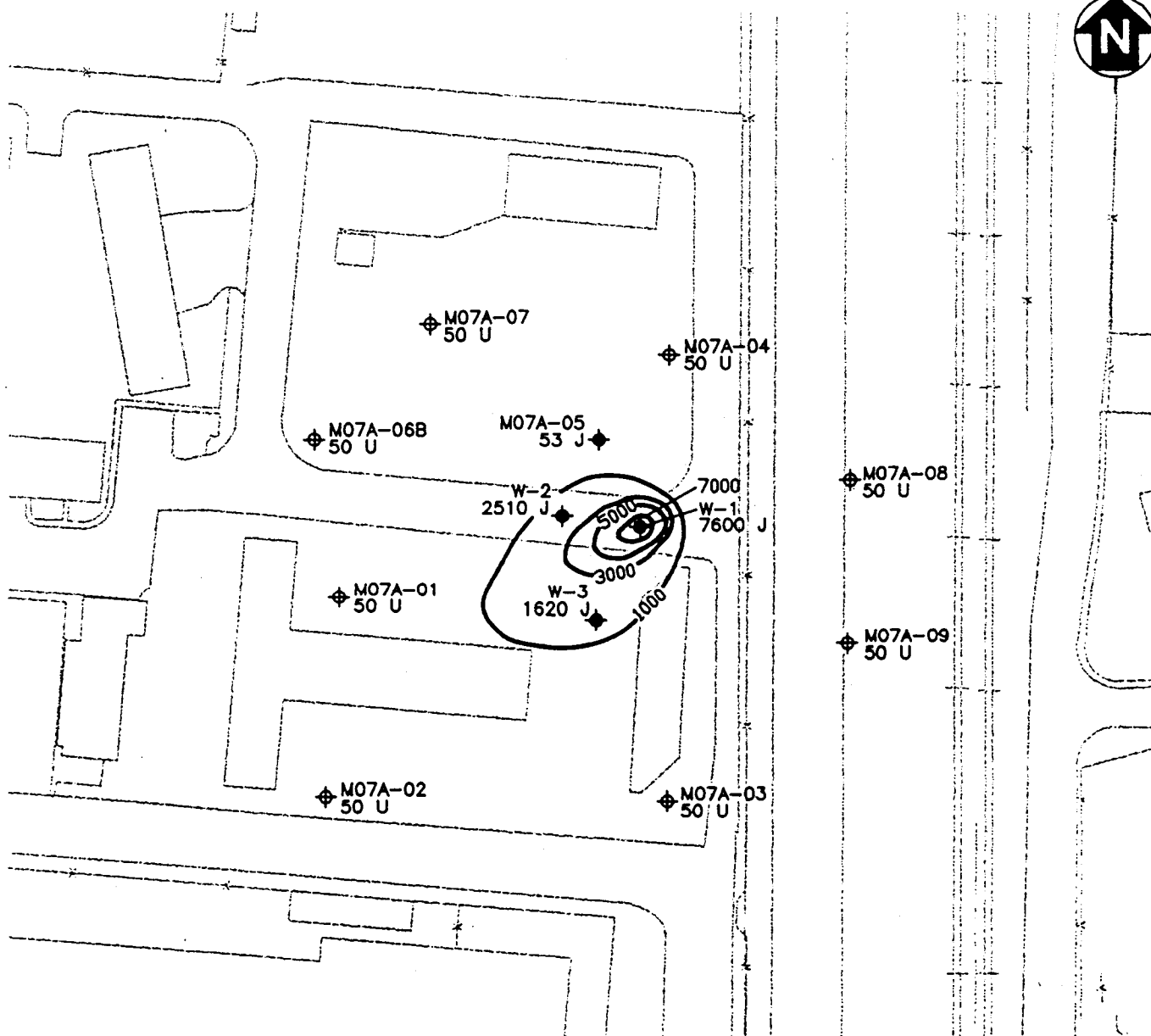
LEGEND

- ⊕ FIRST WATER-BEARING ZONE MONITORING WELL LOCATION
- ◆ FIRST WATER-BEARING ZONE MONITORING WELL LOCATION CHEMICAL CONCENTRATION ABOVE LOWER DETECTION LIMIT

—1000— TPH-E AS DIESEL ISOCONTOUR

NOTE: ALL CONCENTRATIONS IN $\mu\text{g/L}$

FIGURE 10-3
NAS ALAMEDA
ALAMEDA, CALIFORNIA
SITE 7A CONCENTRATION CONTOURS OF
TPH-E AS DIESEL IN GROUNDWATER
FIRST WATER-BEARING ZONE
SEPTEMBER-OCTOBER 1994



50 0 50 100
SCALE: IN FEET

LEGEND

- ⊕ FIRST WATER-BEARING ZONE MONITORING WELL LOCATION
- ◆ FIRST WATER-BEARING ZONE MONITORING WELL LOCATION CHEMICAL CONCENTRATION ABOVE LOWER DETECTION LIMIT

—1000— TPH-P AS UNLEADED GASOLINE ISOCONTOUR

NOTE: ALL CONCENTRATIONS IN $\mu\text{g/L}$

FIGURE 10-4
NAS ALAMEDA
ALAMEDA, CALIFORNIA
SITE 7A CONCENTRATION CONTOURS
OF TPH-P AS UNLEADED GASOLINE IN
GROUNDWATER FIRST WATER-BEARING ZONE
SEPTEMBER-OCTOBER 1994

TABLES

TABLE 1-1
SOLUBILITY THRESHOLD LIMIT CONCENTRATIONS (STLC)
(mg/L)

Metals	Concentrations
Antimony	15
Arsenic	5
Barium	100
Beryllium	0.75
Cadmium	1
Chromium	560
Chromium-VI	5
Cobalt	80
Copper	25
Lead	5
Mercury	0.2
Molybdenum	350
Nickel	20
Selenium	1
Silver	5
Thallium	7
Vanadium	24
Zinc	250

Note: Values obtained from the California Code of Regulations Title 26.

TABLE 1-2

**CTO 260 NAS ALAMEDA
STATISTICAL ANALYSIS OF METALS RESULTS FOR GROUNDWATER SAMPLES**

Metals	Average Concentration	Standard Deviation	Statistical Tolerance Factor	95 Percent/95 Percent STI ^a	
				Lower Limit ($\mu\text{g/L}$) ^b	Upper Limit ($\mu\text{g/L}$)
Aluminum	29.9	19.2	6.37	0	152
Antimony	23.5	9.6	6.37	0	84.5
Arsenic	4.7	5.0	6.37	0	36.3
Barium	245	292	6.37	0	2,100
Beryllium	1.3	0	6.37	1.3	1.3
Cadmium	2.0	0	6.37	2.0	2.0
Calcium	83,500	39,600	6.37	0	336,000
Chromium	3.2	0	6.37	3.2	3.2
Cobalt	8.6	0	6.37	8.6	8.6
Copper	3.8	3.8	6.37	0	27.7
Iron	1,110	1,270	6.37	0	9,200
Lead	1.0	0	6.37	1.0	1.0
Magnesium	111,000	148,000	6.37	0	1,050,000
Manganese	892	682	6.37	0	5,240
Mercury	0.1	0	6.37	0.1	0.1
Nickel	6.6	0	6.37	6.6	6.6
Potassium	40,200	42,200	6.37	0	309,000
Selenium	1.0	0	6.37	1.0	1.0
Silver	2.4	0	6.37	2.4	2.4
Sodium	235,000	336,000	6.37	0	2,380,000
Thallium	0.9	0	6.37	0.9	0.9
Vanadium	10.9	9.4	6.37	0	70.7
Zinc	4.0	3.4	6.37	0	25.7

Source: PRC/JMM, 1992c

^a Tolerance Interval = Average \pm (Standard Deviation x Statistical Tolerance Factor) (Taylor 1990)

^b Negative concentrations are rounded to zero.

STI - Statistical Tolerance Interval

TABLE 2-1
VERTICAL GROUNDWATER GRADIENTS
SITES 3, 7A, 7C, 9, 10B, 13 AND 19
CTO 280
ALAMEDA NAVAL AIR STATION

Site	Well Cluster	Elevation First Water-Bearing Zone (Feet above MLLW)*	Elevation Second Water-Bearing Zone (Feet above MLLW)	Elevation Difference (feet)	Gradient Direction
3	M03-04/D03-01	7.43	7.73	0.30	upward
7A	W-1/D7A-01	9.81	9.11	-0.70	downward
	M07A-03/D7A-02	9.74	9.41	-0.33	downward
	M07A-02/D7A-03	6.08	9.00	2.92	upward
7C	MW547-2/D7C-01	12.03	10.71	-1.32	downward
9	MW410-2/D09-01	9.27	7.92	-1.35	downward
10B	MW530-3/D10B-01	9.88	8.20	-1.68	downward
13	MWOR-4/D13-01	11.78	9.88	-1.90	downward
19	MWD13-2/D19-01	10.44	9.20	-1.24	downward

* MLLW - Mean Low Low Water

TABLE 3-1

**SUMMARY OF FIELD SAMPLING PLAN VARIANCES
CTO 280
ALAMEDA NAVAL AIR STATION**

Field and Location Identification	Variation From Follow-On Field Sampling Plan ^a	Reason for Field Variance	Resolution of Field Variances
CPT			
CPT-1-3	CPT not conducted	Location cancelled per memo dated July 11, 1994. ^b	Utilized geotechnical boring log information in lieu of CPT.
CPT-1-9	CPT not conducted	Location cancelled per memo dated July 11, 1994. ^b	Utilized geotechnical boring log information in lieu of CPT.
CPT-RA-1	CPT not conducted	Location cancelled per memo dated July 11, 1994. ^b	Utilized geotechnical boring log information in lieu of CPT.
CPT-S13-01	CPT not conducted	Location cancelled per memo dated July 11, 1994. ^b	Utilized geotechnical boring log information in lieu of CPT.
CPT-S15-02	CPT not conducted	Location cancelled per memo dated July 11, 1994. ^b	Utilized geotechnical boring log information in lieu of CPT.
CPT-S03-05	Location moved	Encountered underground utilities.	Moved location approximately 100 feet west.
CPT-S05-10	CPT not conducted	Location inaccessible due to the confines of the building.	CPT not conducted.
CPT-S11-03	CPT not conducted	"Area 37" locations cancelled. ^c	CPT not conducted.
CPT-S11-04	CPT not conducted	"Area 37" locations cancelled. ^c	CPT not conducted.
CPT-S11-05	CPT not conducted	"Area 37" locations cancelled. ^c	CPT not conducted.
CPT-S11-06	CPT not conducted	"Area 37" locations cancelled. ^c	CPT not conducted.
CPT-S07A-05	Added to original scope	Assess extent of gasoline impact in groundwater.	CPT conducted at this location.
CPT-S07A-06	Added to original scope	Assess extent of gasoline impact in groundwater.	CPT conducted at this location.
CPT-S07A-07	Added to original scope	Assess extent of gasoline impact in groundwater.	CPT conducted at this location.
CPT-S07A-08	Added to original scope	Assess extent of gasoline impact in groundwater.	CPT conducted at this location.
CPT-S07A-09	Added to original scope	Assess extent of gasoline impact in groundwater.	CPT conducted at this location.
CPT-S07A-10	Added to original scope	Assess extent of gasoline impact in groundwater.	CPT conducted at this location.
CPT-S07A-11	Added to original scope	Assess extent of gasoline impact in groundwater.	CPT conducted at this location.
HydroPunch			
SHP-S13-01	HydroPunch not conducted	Geoprobe samples in lieu of HydroPunch sample	HydroPunch sample not obtained.
HP-S13-01	HydroPunch not conducted	Geoprobe samples in lieu of HydroPunch sample	HydroPunch sample not obtained.
HP-S13-02	HydroPunch not conducted	Geoprobe samples in lieu of HydroPunch sample	HydroPunch sample not obtained.
DHP-S13-01	HydroPunch not conducted	Location was cancelled per memo dated July 11, 1994 from PRC to the Navy and for GeoProbe. ^b	HydroPunch sample not obtained.
DHP-S15-02	HydroPunch not conducted	Location cancelled per memo dated July 11, 1994. ^b	HydroPunch sample not obtained.
DHP-S05-10	HydroPunch not conducted	CPT rig had no access, GeoProbe could not obtain depth needed.	HydroPunch sample not obtained.
SHP-S05-08	Did not collect sample with H.P. tool	Work space requirements, surface completions, access time.	Location completed using GeoProbe.

TABLE 3-1

SUMMARY OF FIELD SAMPLING PLAN VARIANCES
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

Field and Location Identification	Variation From Follow-On Field Sampling Plan ^a	Reason for Field Variance	Resolution of Field Variances
HydroPunch (Cont.)			
SHP-S05-09	Did not collect sample with H.P. tool	Work space requirements, surface completions, access time.	Location completed using GeoProbe.
SHP-S05-10	Did not collect sample with H.P. tool	Work space requirements, surface completions, access time.	Location completed using GeoProbe.
SHP-S11-03	HydroPunch not conducted	"Area 37" locations cancelled. ^c	HydroPunch sample not obtained.
DHP-S11-03	HydroPunch not conducted	"Area 37" locations cancelled. ^c	HydroPunch sample not obtained.
SHP-S11-04	HydroPunch not conducted	"Area 37" locations cancelled. ^c	HydroPunch sample not obtained.
DHP-S11-04	HydroPunch not conducted	"Area 37" locations cancelled. ^c	HydroPunch sample not obtained.
SHP-S11-05	HydroPunch not conducted	"Area 37" locations cancelled. ^c	HydroPunch sample not obtained.
DHP-S11-05	HydroPunch not conducted	"Area 37" locations cancelled. ^c	HydroPunch sample not obtained.
SHP-S11-06	HydroPunch not conducted	"Area 37" locations cancelled. ^c	HydroPunch sample not obtained.
DHP-S11-06	HydroPunch not conducted	"Area 37" locations cancelled. ^c	HydroPunch sample not obtained.
DHP-S09-06	HydroPunch not conducted	CPT-S09-06 location encountered refusal.	HydroPunch sample not obtained.
DHP-S10B-06	HydroPunch not conducted	CPT-S10B-06 location encountered refusal.	HydroPunch sample not obtained.
DHP-S03-05	Location moved	Encountered underground utilities.	Moved location approximately 100 feet west.
DHP-S07A-05	Added to original scope	Assess extent of gasoline impact in clay layer.	HydroPunch groundwater sample collected.
SHP-S07A-05	Added to original scope	Assess extent of gasoline impact in fill layer.	HydroPunch groundwater sample collected.
SHP-S07A-06	Added to original scope	Assess extent of gasoline impact in fill layer.	HydroPunch groundwater sample collected.
DHP-S07A-07	Added to original scope	Assess extent of gasoline impact in clay layer.	HydroPunch groundwater sample collected.
SHP-S07A-07	Added to original scope	Assess extent of gasoline impact in fill layer.	HydroPunch groundwater sample collected.
DHP-S07A-08	Added to original scope	Assess extent of gasoline impact in clay layer.	HydroPunch groundwater sample collected.
DHP-S07A-09	Added to original scope	Assess extent of gasoline impact in clay layer.	HydroPunch groundwater sample collected.
SHP-S07A-09	Added to original scope	Assess extent of gasoline impact in fill layer.	HydroPunch groundwater sample collected.
DHP-S07A-10	Added to original scope	Assess extent of gasoline impact in clay layer.	HydroPunch groundwater sample collected.
DHP-S07A-11	Added to original scope	Assess extent of gasoline impact in clay layer.	HydroPunch groundwater sample collected.
SHP-S07A-11	Added to original scope	Assess extent of gasoline impact in fill layer.	HydroPunch groundwater sample collected.
Sites 1, 2, and Runway Area	Suffix name changed from "C" to "D"	Sample not obtained from "C" zone.	Sample obtained from sand lense in Holocene Bay Mud unit and called a "D" zone sample.

TABLE 3-1

SUMMARY OF FIELD SAMPLING PLAN VARIANCES
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

Field and Location Identification	Variation From Follow-On Field Sampling Plan ^a	Reason for Field Variance	Resolution of Field Variances
Piezometer			
PEZ-S05-08	Location completed using GeoProbe techniques.	Work space requirements, surface completions, access time.	Location completed using GeoProbe techniques.
PEZ-S05-09	Location completed using GeoProbe techniques.	Work space requirements, surface completions, access time.	Location completed using GeoProbe techniques.
PEZ-S05-10	Location completed using GeoProbe techniques.	Work space requirements, surface completions, access time.	Location completed using GeoProbe techniques.
PEZ-S11-03	Piezometer not installed	"Area 37" locations cancelled. ^c	Piezometer not installed.
PEZ-S11-04	Piezometer not installed	"Area 37" locations cancelled. ^c	Piezometer not installed.
PEZ-S11-05	Piezometer not installed	"Area 37" locations cancelled. ^c	Piezometer not installed.
PEZ-S11-06	Piezometer not installed	"Area 37" locations cancelled. ^c	Piezometer not installed.
CPT Soil Samples			
All samples	CPT soil samples not collected by the CPT Rig	1.5 by 6 inch CPT soil sample tubes do not provide sufficient sample volumes for analyses required.	Soil samples collected using a hand-auger and slide hammer, fitted with a single 2 by 6 inch stainless steel sleeve.
CPT-S05-09	CPT soil samples not collected	Soil samples not collected as part of GeoProbe investigation.	Soil samples not collected.
CPT-S05-10	CPT soil samples not collected		Soil samples not collected.
Surface Soil Sampling			
Runway Samples	Surface soil sampling in the Runway Area cancelled	Surface soil sampling in the Runway Area cancelled due to potential duplication of effort by the PRC Team and ERM West; however, SSRR-7 was collected.	Only 1 sample collected.
Site 15 Samples	Site 15 surface soil samples SS15-64 through SS15-97 not collected	Pending removal action to remove top 2 feet of soil.	No samples collected.
Shallow Borings and Monitoring Wells			
B03-01 through B03-07	Locations cancelled	Work completed by PRC.	Collected in GeoProbe.
M03-07	M03-07 added to original scope	Based on GeoProbe information.	M03-07 installed as shallow well.

TABLE 3-1

SUMMARY OF FIELD SAMPLING PLAN VARIANCES
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

Field and Location Identification	Variation From Follow-On Field Sampling Plan ^a	Reason for Field Variance	Resolution of Field Variances
Shallow Borings and Monitoring Wells (Cont.)			
M03-08	M03-08 added to original scope	Based on Geoprobe information.	M03-08 installed as shallow well.
M07A-06	Locations moved	Well relocated based on recent HydroPunch data.	Well relocated.
M07A-07	Locations moved	Well relocated based on recent HydroPunch data.	Well relocated.
M07A-08	M07A-08 added to original scope	Added to monitor potential off-base migration of gasoline impact.	M07A-08 installed as shallow well.
M07A-09	M07A-09 added to original scope	Added to monitor potential off-base migration of gasoline impact.	M07A-09 installed as shallow well.
M10B-01	M10B-01 added to original scope	To combine with D10B-02 for vertical gradient.	M10B-01 installed as shallow well.
B13-28 through B13-31	Locations moved	Based on Geoprobe information.	Borings relocated based on GeoProbe groundwater results.
Auger size	8.25-inch augers used instead of proposed 11.25-inch augers	Industry standard for 2-inch well, generates less IDW and filterpack volume is decreased.	The sufficient 8.25 augers decreasing project cost and time.
Sampler size	2-inch ID sampler used instead of 2.5-inch proposed sampler	In hard soils, the 2-inch sampler can be driven further obtaining more lithologic information per sample driven.	2-inch sampler used provided sufficient soil volume for chemical analysis and greater lithologic sampling information.
Well screening	Select wells did not have 1 to 2 feet of screen above water table.	Water level of several wells was 1.5 feet bgs.	Well screened as high as possible, 2 feet bgs, allowing for seal.
Filter pack material	A #2/12 Monterey sand was used in place of Monterey #2/16	A #2/12 sand was used to help prevent bridging problems during filter pack placement and to help control heaving sands.	The heavier sand reduced heaving sand problems and helped to ensure complete packing of the screened zone.
Filter pack level	Filter pack ranged from 0.5 to 2 feet above the screen.	Decreased filter pack above slotted casing was necessary to emplace the screen above the static water level.	Reduced filter pack helped in proper well screen elevation.
Bentonite seal	Bentonite seal ranged between 0.5 to 2 feet above filter pack	Decreased bentonite seal was required to emplace the screen above the static water level.	Reduced bentonite seal helped in proper well screen elevation.
Deep Drilling			
M-023-C	Added to original scope	Well requested by RWQCB and DTSC.	Monitoring well M023-C installed.
Filter pack material	A #2/12 Monterey sand was used in place of Monterey #2/16	The slightly coarser sand provided more even flow into the well annulus thus preventing potential bridging and allowing a more effective filter pack.	The heavier sand reduced heaving sand and bridging problems and allowed for a more effective filter pack.

TABLE 3-1

SUMMARY OF FIELD SAMPLING PLAN VARIANCES
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

Field and Location Identification	Variation From Follow-On Field Sampling Plan ^a	Reason for Field Variance	Resolution of Field Variances
Deep Drilling (Cont.)			
Filter pack level	Additional filter pack material utilized	Additional filter pack used to prevent intrusion of bentonite slurry in to the well screen.	Extra filter pack length.
Bentonite seal	Additional bentonite seal utilized	Additional bentonite seal was used to prevent intrusion of cement into the bentonite slurry and in to the well screen.	Additional bentonite seal thickness.
Casing size	3-inch ID casings used for deep wells instead of 2-inch proposed.	Larger casing size allowed for larger surge blocks, bailers and pumps to enhance well development of deep mud rotary wells.	All deep wells are 3-inch ID well casings.
Conductor Casing	8 and 5/8-inch steel conductor casing used in place of a 10 inch	8 and 5/8-inch steel conductor casing is of sufficient size for mud rotary drilling tools and reduces generated cuttings.	Decreased casing size decreased HSA size required for larger casing resulting in less cuttings and quicker installations.
Non-Point Source Sampling			
NPS-S03-05	No samples collected	No access, utility vault secured with extraction equipment.	No samples collected.
NPS-S03-06	No samples collected	Construction work has removed proposed manhole location.	No samples collected.
NPS-S7A-01	No samples collected	No access, utility vault welded shut.	No samples collected.
NPS-S15-01	No samples collected	Construction work has removed proposed manhole location.	No samples collected.
Sample Handling			
Field screening of soil samples	Screen samples were placed in a ziplock plastic bag instead of a stainless steel liner with end caps and allowed to stand for 10 minutes instead of 5 minutes	The modification allows for better volatilization of VOCs from the soil and minimizes the loss of VOC vapor during headspace measurements using an organic vapor analyzer.	The modification improves the accuracy of the field screened VOC soil samples during headspace measurements using an organic vapor analyzer.
Securing soil sample tubes	Duct tape was not used to secure sample tubes	Reduce possible cross contamination of soil samples.	Duct tape was not used to secure sample tubes.

^a Three Follow-On Field Sampling Plans (FSP) were used as guidelines for the CTO-0280 field program. The three FSPs are: Follow-On Field Sampling Plan Remedial Investigation/Feasibility Study Phase 2A, Follow-On Field Sampling Plan Remedial Investigation/Feasibility Study 2B and 3, and Follow-On Field Sampling Plan Remedial Investigation/Feasibility Study Phase 5 and 6 - Landfill Investigation.

^b Memo dated July 11, 1994 from PRC to the Navy.

^c These locations were planned to address "Area 37". Area 37 work was suspended for either GeoProbe or other future investigative work.

TABLE 3-2
SUMMARY OF CPT AND HYDROPUNCH DEPTHS
CTO 280
ALAMEDA NAVAL AIR STATION

Site	CPT I.D.	CPT Depth (feet bgs)	Shallow HydroPunch I.D.	Shallow HydroPunch Depth (feet bgs)	Deep HydroPunch I.D.	Deep HydroPunch Depth (feet bgs)
1	CPT-S01-01	40.7	HP1-2-A	8.5	HP1-2-D	37.0
	CPT-S01-02	37.3	HP1-2-E	16.0	HP1-5-D	45.0
	CPT-S01-04	46.4	HP1-5-A	8.0	HP1-8-D	47.0
	CPT-S01-05	56.7	HP1-5-E	18.0	HP1-10-D	48.7
	CPT-S01-06	43.4	HP1-8-A	8.0	HP1-11-D	60.0
	CPT-S01-07	52.9	HP1-8-E	15.0		
	CPT-S01-08	49.0	HP1-10-A	8.0		
	CPT-S01-10	66.4	HP1-10-E	17.0		
	CPT-S01-11	62.0	HP1-11-A	8.0		
	CPT-S01-12	121.1	HP1-11-E	17.0		
2	CPT-S02-01	56.0	HP2-1-A	12.0	HP2-1-D	46.0
	CPT-S02-02	54.4	HP2-1-E	21.0	HP2-2-D	44.0
	CPT-S02-03	46.5	HP2-2-A	9.0	HP2-4-D	44.0
	CPT-S02-04	47.2	HP2-2-E	15.0	HP2-5-D	38.0
	CPT-S02-05	126.8	HP2-4-A	8.0		
	CPT-S02-06	133.1	HP2-4-E	18.0		
	CPT-S02-07	78.5	HP2-5-A	8.0		
			HP2-5-E	22.0		
Runway Area	CPT-RA-02	72.6	HPRA-1-A	10.0	HPRA-1-D	45.0
	CPT-RA-03	60.0	HPRA-1-E	18.0	HPRA-4-D	60.0
	CPT-RA-04	66.0	HPRA-4-A	8.0	HPRA-6-D	29.0
	CPT-RA-05	40.5	HPRA-4-E	13.0	HPRA-8-D	46.0
	CPT-RA-06	39.0	HPRA-6-A	8.0	HPRA-13-D	58.0
	CPT-RA-07	50.0	HPRA-6-E	14.0	HPRA-20-D	47.0
	CPT-RA-08	126.2	HPRA-8-A	8.0	HPRA-23-D	44.0
	CPT-RA-09	86.0	HPRA-8-E	23.0		
	CPT-RA-10	50.8	HPRA-13-A	8.0		
	CPT-RA-11	79.8	HPRA-13-E	17.0		
	CPT-RA-12	122.5	HPRA-20-A	8.0		
	CPT-RA-13	133.9	HPRA-20-E	20.0		
	CPT-RA-14	100.2	HPRA-23-A	8.0		

TABLE 3-2

SUMMARY OF CPT AND HYDROPUNCH DEPTHS
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

Site	CPT I.D.	CPT Depth (feet bgs)	Shallow HydroPunch I.D.	Shallow HydroPunch Depth (feet bgs)	Deep HydroPunch I.D.	Deep HydroPunch Depth (feet bgs)
Runway Area (Cont.)	CPT-RA-15	105.1	HPRA-23-E	22.0		
	CPT-RA-16	127.4				
	CPT-RA-17	57.7				
	CPT-RA-18	57.7				
	CPT-RA-19	55.0				
	CPT-RA-20	55.0				
	CPT-RA-21	51.0				
	CPT-RA-22	56.0				
	CPT-RA-23	51.7				
3	CPT-S03-01	44.7			DHP-S03-01	31.3
	CPT-S03-02	42.8			DHP-S03-02	34.0
	CPT-S03-03	41.0			DHP-S03-03	21.0
	CPT-S03-04	31.3			DHP-S03-04	22.4
	CPT-S03-05	47.0			DHP-S03-05	22.0
6	CPT-S06-01	53.0			DHP-S06-01	45.0
	CPT-S06-02	51.0			DHP-S06-02	45.0
	CPT-S06-03	54.6			DHP-S06-03	30.0
	CPT-S06-04	53.1			DHP-S06-04	39.0
7A	CPT-S07A-01	55.1	SHP-S07A-05	6.0	DHP-S07A-01	45.0
	CPT-S07A-02	71.8	SHP-S07A-06	6.0	DHP-S07A-02	65.0
	CPT-S07A-03	48.8	SHP-S07A-07	6.0	DHP-S07A-03	40.0
	CPT-S07A-04	45.8	SHP-S07A-08	6.0	DHP-S07A-04	43.0
	CPT-S07A-05	16.4	SHP-S07A-09	6.0	DHP-S07A-05	16.0
	CPT-S07A-06	16.7	SHP-S07A-10	6.0	DHP-S07A-07	16.0
	CPT-S07A-07	16.7	SHP-S07A-11	6.0	DHP-S07A-09	16.0
	CPT-S07A-08	16.4			DHP-S07A-11	16.0
	CPT-S07A-09	49.7				
	CPT-S07A-10	16.4				

TABLE 3-2

SUMMARY OF CPT AND HYDROPUNCH DEPTHS
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

Site	CPT I.D.	CPT Depth (feet bgs)	Shallow HydroPunch I.D.	Shallow HydroPunch Depth (feet bgs)	Deep HydroPunch I.D.	Deep HydroPunch Depth (feet bgs)
7A (Cont.)	CPT-S07A-11	16.4				
7B & 11	CPT-S07B-01	34.3			DHP-S07B-01	28.5
	CPT-S07B-02	41.8			DHP-S07B-02	26.3
	CPT-S11-01	24.8			DHP-S11-01	24.0
	CPT-S11-02	43.3			DHP-S11-02	24.8
7C	CPT-S07C-01	46.7			DHP-S07C-01	22.5
	CPT-S07C-02	42.0			DHP-S07C-02	21.0
	CPT-S07C-03	53.0			DHP-S07C-03	26.0
	CPT-S07C-04	48.0			DHP-S07C-04	16.0
9	CPT-S09-01	44.6	SHP-S09-05	15.0	DHP-S09-01	25.8
	CPT-S09-02	47.9	SHP-S09-06	11.0	DHP-S09-02	30.0
	CPT-S09-03	49.5	SHP-S09-07	11.0	DHP-S09-03	24.4
	CPT-S09-04	50.0	SHP-S09-08	11.0	DHP-S09-04	22.0
	CPT-S09-05	50.0	SHP-S09-09	11.0	DHP-S09-05	26.0
	CPT-S09-06	29.5	SHP-S09-10	11.0	DHP-S09-07	24.0
	CPT-S09-07	31.2	SHP-S09-11	15.0	DHP-S09-08	24.0
	CPT-S09-08	39.2	SHP-S09-12	8.0	DHP-S09-09	25.0
	CPT-S09-09	41.6			DHP-S09-10	30.0
	CPT-S09-10	45.7			DHP-S09-11	24.0
	CPT-S09-11	48.0			DHP-S09-12	26.0
	CPT-S09-12	49.9				
10B	CPT-S10B-01	40.2	SHP-S10B-05	8.0	DHP-S10B-01	40.0
	CPT-S10B-02	40.0	SHP-S10B-06	8.0	DHP-S10B-02	33.0
	CPT-S10B-03	46.4			DHP-S10B-03	24.0
	CPT-S10B-04	66.7			DHP-S10B-04	24.5
	CPT-S10B-05	41.8			DHP-S10B-05	21.0
	CPT-S10B-06	40.7				

TABLE 3-2

SUMMARY OF CPT AND HYDROPUNCH DEPTHS
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

Site	CPT I.D.	CPT Depth (feet bgs)	Shallow HydroPunch I.D.	Shallow HydroPunch Depth (feet bgs)	Deep HydroPunch I.D.	Deep HydroPunch Depth (feet bgs)
13	CPT-S13-02	33.5			DHP-S13-02	17.9
	CPT-S13-03	28.5			DHP-S13-03	22.0
	CPT-S13-04	38.5			DHP-S13-04	30.0
	CPT-S13-05	17.9			DHP-S13-05	17.0
15	CPT-S15-01	52.0			DHP-S15-01	31.0
	CPT-S15-03	49.4			DHP-S15-03	42.7
16	CPT-S16-01	43.3			DHP-S16-01	36.0
	CPT-S16-02	56.3			DHP-S16-02	26.8
	CPT-S16-03	62.8			DHP-S16-03	24.5
	CPT-S16-04	55.6			DHP-S16-04	24.0
19	CPT-S19-01	47.7	HP-S19-01	13.0	DHP-S19-01	19.0
	CPT-S19-02	41.8	HP-S19-02	10.0	DHP-S19-02	22.0
	CPT-S19-03	36.9	HP-S19-03	10.0	DHP-S19-03	20.5
	CPT-S19-04	44.3	SHP-S19-05		DHP-S19-04	21.3
	CPT-S19-05	20.3			DHP-S19-05	10.0
4 ^a	CPT-S04-05	43.5				
5 ^a	CPT-S05-08	77.9			DHP-S05-08	47.0
	CPT-S05-09	52.2			DHP-S05-09	44.0
	CPT-S05-11	54.45	SHP-S05-11	8.0	DHP-S05-11	45.0
	CPT-S05-12	54.45	SHP-S05-12	8.0	DHP-S05-12	51.0
10A ^a	CPT-S10A-05	39	SHP-S10A-02	8	DHP-S10A-05	34.0
			SHP-S10A-05	8		

^a CPT/HydroPunch work conducted at these sites is discussed in Attachment 6.

TABLE 3-3

**SUMMARY OF ANALYSES PERFORMED ON HYDROPUNCH GROUNDWATER SAMPLES
CTO 280
ALAMEDA NAVAL AIR STATION**

Site	Field ID	Sample Depth (feet)	Analysis (Method)										Cyanide
			VOC (CLP)	SVOCs (CLP)	TPH-Purg (MOD 8015)	TPH-Extr (MOD 8015)	Metals (CLP)	General Chemicals	TOC/ COD	Sulfide	EDB	Pest/PCB (CLP)	
1	HP1-2-A	8.5	X	X				X					
	HP1-2-E	16.0	X	X				X					
	HP1-2-D	37.0	X	X				X					
	HP1-5-A	8.0	X	X				X					
	HP1-5-E	18.0	X	X				X					
	HP1-5-D	45.0	X	X			X	X					
	HP1-8-A	8.0	X	X				X					
	HP1-8-E	15.0	X	X				X					
	HP1-8-D	47.0	X	X				X					
	HP1-10-A	8.0	X					X					
	HP1-10-E	17.0	X	X				X					
	HP1-10-D	48.7	X	X				X					
	HP1-11-A	8.0	X	X				X					
	HP1-11-E	17.0	X	X				X					
	HP1-11-D	60.0	X	X				X					
2	HP2-1-A	12.0	X	X				X					
	HP2-1-E	21.0	X	X				X					
	HP2-1-D	46.0	X	X				X					
	HP2-2-A	9.0	X	X				X					
	HP2-2-E	15.0	X	X				X					
	HP2-2-D	44.0	X	X				X					

TABLE 3-3

SUMMARY OF ANALYSES PERFORMED ON HYDROPUNCH GROUNDWATER SAMPLES
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

Site	Field ID	Sample Depth (feet)	Analysis (Method)										Cyanide
			VOC (CLP)	SVOCs (CLP)	TPH-Purg (MOD 8015)	TPH-Extr (MOD 8015)	Metals (CLP)	General Chemicals	TOC/ COD	Sulfide	EDB	Pest/PCB (CLP)	
2 (Cont.)	HP2-4-A	8.0	X	X				X					
	HP2-4-E	18.0	X	X				X					
	HP2-4-D	44.0	X	X				X					
	HP2-5-A	8.0	X	X				X					
	HP2-5-E	22.0	X	X				X					
	HP2-5-D	38.0	X	X				X					
Runway Area	HPRA-1-A	10.0	X	X				X	X				
	HPRA-1-E	18.0	X	X				X					
	HPRA-1-D	45.0	X	X				X					
	HPRA-4-A	8.0	X	X				X					
	HPRA-4-E	13.0	X	X				X					
	HPRA-4-D	60.0	X	X				X					
	HPRA-6-A	8.0	X	X				X					
	HPRA-6-E	14.0	X	X				X					
	HPRA-6-D	29.0	X	X				X					
	HPRA-8-A	8.0	X	X				X					
	HPRA-8-E	23.0	X	X				X					
	HPRA-8-D	46.0	X	X				X					
	HPRA-13-A	8.0	X	X				X					
	HPRA-13-E	17.0	X	X				X					
	HPRA-13-D	58.0	X	X				X					

TABLE 3-3

SUMMARY OF ANALYSES PERFORMED ON HYDROPUNCH GROUNDWATER SAMPLES
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

Site	Field ID	Sample Depth (feet)	Analysis (Method)										
			VOC (CLP)	SVOCs (CLP)	TPH-Purg (MOD 8015)	TPH-Extr (MOD 8015)	Metals (CLP)	General Chemicals	TOC/ COD	Sulfide	EDB	Pest/PCB (CLP)	Cyanide
Runway Area (Cont.)	HPRA-20-A	8.0	X	X				X					
	HPRA-20-E	20.0	X	X				X					
	HPRA-20-D	47.0	X	X				X					
	HPRA-23-A	8.0	X	X				X					
	HPRA-23-E	22.0	X	X				X					
	HPRA-23-D	44.0	X	X				X					
3	DHP-S03-01	31.3	X				X	X			X		
	DHP-S03-02	34.0	X					X			X		
	DHP-S03-03	21.0	X				X	X			X		
	DHP-S03-04	22.4	X	X				X			X		
	DHP-S03-05	22.0	X				X	X			X		
6	DHP-S06-01	45.0	X	X			X	X					
	DHP-S06-02	45.0	X	X			X	X					
	DHP-S06-03	30.0	X	X			X	X		X			
	DHP-S06-04	39.0	X	X			X	X					
7A	DHP-S07A-01	45.0	X		X	X	X	X				X	
	DHP-S07A-02	65.0	X		X	X		X				X	
	DHP-S07A-03	40.0	X		X	X	X	X				X	

TABLE 3-3

SUMMARY OF ANALYSES PERFORMED ON HYDROPUNCH GROUNDWATER SAMPLES
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

Site	Field ID	Sample Depth (feet)	Analysis (Method)										Cyanide
			VOC (CLP)	SVOCs (CLP)	TPH-Purg (MOD 8015)	TPH-Extr (MOD 8015)	Metals (CLP)	General Chemicals	TOC/ COD	Sulfide	EDB	Pest/PCB (CLP)	
7A (Cont.)	DHP-S07A-04	43.0	X		X	X	X	X				X	
	SHP-S07A-05	6.0	X		X	X							
	DHP-S07A-05	16.0	X		X	X							
	SHP-S07A-06	6.0	X		X								
	SHP-S07A-07	6.0	X		X	X							
	DHP-S07A-07	16.0	X		X	X							
	SHP-S07A-08	6.0	X		X	X							
	SHP-S07A-09	6.0	X		X	X							
	DHP-S07A-09	16.0	X		X	X							
	SHP-S07A-10	6.0	X	X	X	X							
	SHP-S07A-11	6.0	X		X	X							
	DHP-S07A-11	16.0	X		X								
7B & 11	DHP-S07B-01	28.5	X		X	X	X	X	X				
	DHP-S07B-02	26.3	X		X	X	X	X	X				
	DHP-S11-01	24.0	X		X	X	X	X	X				
	DHP-S11-02	24.8	X		X	X	X	X	X				
7C	DHP-S07C-01	22.5	X	X	X	X	X	X			X		
	DHP-S07C-02	21.0	X	X	X	X	X	X			X		
	DHP-S07C-03	26.0	X	X	X	X	X	X					

TABLE 3-3

SUMMARY OF ANALYSES PERFORMED ON HYDROPUNCH GROUNDWATER SAMPLES
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

Site	Field ID	Sample Depth (feet)	Analysis (Method)										
			VOC (CLP)	SVOCs (CLP)	TPH-Purg (MOD 8015)	TPH-Extr (MOD 8015)	Metals (CLP)	General Chemicals	TOC/ COD	Sulfide	EDB	Pest/PCB (CLP)	Cyanide
7C (Cont.)	DHP-S07C-04	16.0	X	X	X	X	X	X			X		
9	DHP-S09-01	25.8	X	X	X	X	X	X					
	DHP-S09-02	30.0	X	X	X	X	X	X					
	DHP-S09-03	24.4	X	X			X	X					
	DHP-S09-04	22.0	X	X			X	X	X				
	SHP-S09-05	15.0	X	X			X	X	X				
	DHP-S09-05	26.0	X	X			X	X					
	SHP-S09-06	11.0	X	X			X	X					
	SHP-S09-07	11.0	X	X			X	X					
	DHP-S09-07	24.0	X	X			X	X					
	SHP-S09-08	11.0	X	X			X	X	X				
	DHP-S09-08	24.0	X	X			X	X					
	SHP-S09-09	11.0	X	X			X	X					
	DHP-S09-09	25.0	X	X			X	X	X				
	SHP-S09-10	11.0	X	X			X	X					
	DHP-S09-10	30.0	X	X			X	X	X				
	SHP-S09-11	15.0	X	X			X	X	X				
	DHP-S09-11	24.0	X	X			X	X	X				
	SHP-S09-12	8.0	X	X			X	X	X				
	DHP-S09-12	26.0	X	X			X	X	X				

TABLE 3-3

**SUMMARY OF ANALYSES PERFORMED ON HYDROPUNCH GROUNDWATER SAMPLES
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)**

Site	Field ID	Sample Depth (feet)	Analysis (Method)										Cyanide
			VOC (CLP)	SVOCs (CLP)	TPH-Purg (MOD 8015)	TPH-Extr (MOD 8015)	Metals (CLP)	General Chemicals	TOC/ COD	Sulfide	EDB	Pest/PCB (CLP)	
10B	DHP-S10B-01	40.0	X	X	X	X	X	X		X			
	DHP-S10B-02	33.0	X	X	X	X	X	X		X			
	DHP-S10B-03	24.0	X	X	X	X	X	X					
	DHP-S10B-04	24.5	X	X	X	X	X	X	X	X			
	SHP-S10B-05	8.0	X	X	X	X	X	X	X	X			
	DHP-S10B-05	21.0	X	X	X	X	X	X					
	SHP-S10B-06	8.0	X	X	X	X	X						
13	DHP-S13-02	17.9	X	X	X	X	X	X					
	DHP-S13-03	22.0	X	X	X	X	X	X					
	DHP-S13-04	30.0	X	X	X	X	X	X					
	DHP-S13-05	17.0	X	X	X	X	X	X					
15	DHP-S15-01	31.0	X				X	X					
	DHP-S15-03	42.7	X				X	X					
16	DHP-S16-01	36.0	X	X			X	X					
	DHP-S16-02	26.8	X	X			X	X	X				
	DHP-S16-03	24.5	X	X			X	X					
	DHP-S16-04	24.0	X	X			X	X	X				

TABLE 3-3

**SUMMARY OF ANALYSES PERFORMED ON HYDROPUNCH GROUNDWATER SAMPLES
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)**

Site	Field ID	Sample Depth (feet)	Analysis (Method)										
			VOC (CLP)	SVOCs (CLP)	TPH-Purg (MOD 8015)	TPH-Extr (MOD 8015)	Metals (CLP)	General Chemicals	TOC/ COD	Sulfide	EDB	Pest/PCB (CLP)	Cyanide
19	SHP-S19-01	13.0			X	X		X	X				
	SHP-S19-02	10.0			X	X		X	X				
	SHP-S19-03	10.0			X	X		X	X				
	DHP-S19-01	19.0	X	X	X	X	X	X					
	DHP-S19-02	22.0	X	X	X	X	X	X					
	DHP-S19-03	20.5	X		X	X	X	X					
	DHP-S19-04	21.3	X	X	X	X	X	X					
	DHP-S19-05	10.0	X		X	X	X						

Notes:

CLP - Contract Laboratory Program

VOC - Volatile Organic Compounds

COD - Chemical Oxygen Demand

TOC - Total Organic Carbon

EDB - Ethylene Dibromide

Pest/PCB - Pesticides/Polychlorinated Biphenyls

MOD 8015 - Modified EPA Method 8015

SVOC - Semivolatile Organic Compounds

TPH-Purg - Total Petroleum Hydrocarbons, purgeable

TPH-Extr - Total Petroleum Hydrocarbons, extractable

Metal samples were filtered in the field with a 0.45 micron micropore membrane filter.

General chemicals for groundwater samples include:

Total Dissolved Solids

Alkalinity

Acidity

Chemical Oxygen Demand

Sulfate

Sulfide

Chloride

Fluoride

pH

Hardness

Nitrate/Nitrite

Total Organic Carbon

TABLE 3-4

**SUMMARY OF ANALYSES PERFORMED ON SURFACE SOIL SAMPLES
CTO 280
ALAMEDA NAVAL AIR STATION**

Site	Field ID	Analysis (Method)							
		SVOCs (CLP)	TPH-Purg (MOD 8015)	TPH-Extr (MOD 8015)	Metals (CLP)	General Chemicals	Dioxin/Furan (CLP SAS B)	Pest/PCB (CLP)	Cyanide (CLP)
1	SS1-BA-01		X	X	X		X		
	SS1-BA-02		X	X	X		X		
	SS1-BA-03		X	X	X		X		
	SS1-BA-04		X	X	X		X		
	SS1-BA-05		X	X	X		X	X	
	SS1-RA-01	X	X	X	X			X	
	SS1-RA-02	X	X	X	X			X	
	SS1-RA-03	X	X	X	X			X	
	SS1-RA-04	X	X	X	X			X	
	SS1-RA-05	X	X	X	X			X	
	SS1-RA-06	X	X	X	X			X	
	SS1-RA-07	X	X	X	X			X	
	SS1-RA-08	X	X	X	X			X	
	SS1-RA-09	X	X	X	X			X	
	SS1-RA-10	X	X	X	X			X	
	SS1-RA-11	X	X	X	X			X	
	SS1-RA-12	X	X	X	X			X	
	SS1-RA-13	X	X	X	X			X	
	SS1-RA-14	X	X	X	X			X	
	SS1-RA-15	X	X	X	X			X	

TABLE 3-4

SUMMARY OF ANALYSES PERFORMED ON SURFACE SOIL SAMPLES
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

Site	Field ID	Analysis (Method)							
		SVOCs (CLP)	TPH-Purg (MOD 8015)	TPH-Extr (MOD 8015)	Metals (CLP)	General Chemicals	Dioxin/Furan (CLP SAS B)	Pest/PCB (CLP)	Cyanide (CLP)
1 (Cont.)	SS1-RA-16	X	X	X	X			X	
	SS1-RA-17	X	X	X	X			X	
	SS1-RA-18	X	X	X	X			X	
	SS1-RA-19	X	X	X	X			X	
	SS1-RA-20	X	X	X	X	X		X	
	SS1-RA-21	X	X	X	X			X	
	SS1-AA-01	X	X	X	X	X		X	
	SS1-AA-02	X	X	X	X	X			
	SS1-AA-03	X	X	X	X	X			
2	SS2-1		X	X					
	SS2-2		X	X					
	SS2-3		X	X					
	SS2-4		X	X					
	SS2-5		X	X					
	SS2-6		X	X		X			
	SS2-7		X	X					

TABLE 3-4

SUMMARY OF ANALYSES PERFORMED ON SURFACE SOIL SAMPLES
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

Site	Field ID	Analysis (Method)							
		SVOCs (CLP)	TPH-Purg (MOD 8015)	TPH-Extr (MOD 8015)	Metals (CLP)	General Chemicals	Dioxin/Furan (CLP SAS B)	Pest/PCB (CLP)	Cyanide (CLP)
Runway Area	SSRA-01*								
	SSRA-02*								
	SSRA-03*								
	SSRA-04*								
	SSRA-05*								
	SSRA-06*								
	SSRA-07*								
7A	S07A-01							X	
	S07A-02							X	
15	S15-56	X			X			X	
	S15-57	X			X			X	
	S15-58	X			X			X	
	S15-59	X			X			X	
	S15-60	X			X	X		X	
	S15-61	X			X			X	
	S15-62	X			X			X	
	S15-63	X			X			X	
	S15-56								

TABLE 3-4

SUMMARY OF ANALYSES PERFORMED ON SURFACE SOIL SAMPLES
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

Site	Field ID	Analysis (Method)							
		SVOCs (CLP)	TPH-Purg (MOD 8015)	TPH-Extr (MOD 8015)	Metals (CLP)	General Chemicals	Dioxin/Furan (CLP SAS B)	Pest/PCB (CLP)	Cyanide (CLP)
16	S16-56	X			X			X	X
	S16-57	X			X			X	X
	S16-58	X			X			X	X
	S16-59	X			X			X	X
	S16-60	X			X			X	X
	S16-61	X			X			X	X
	S16-62	X			X			X	X
	S16-63	X			X			X	X
	S16-64	X			X			X	X
	S16-65	X			X			X	X
	S16-66	X			X			X	X
	S16-67	X			X			X	X
	S16-68	X			X			X	X
	S16-69	X			X			X	X
	S16-70	X			X			X	X
	S16-71	X			X			X	X

TABLE 3-4

**SUMMARY OF ANALYSES PERFORMED ON SURFACE SOIL SAMPLES
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)**

Notes:

CLP - Contract Laboratory Program

SVOC - Semivolatile Organic Compounds

TPH-Purg - Total Petroleum Hydrocarbons, purgeable

TPH-Extr - Total Petroleum Hydrocarbons, extractable

MOD 8015 - Modified EPA Method 8015

SAS - Special Analytical Services

General chemicals for soil samples include:

Total Organic Carbon

pH

%Moisture

*** - Data not yet received from laboratory.**

Pest/PCB - Pesticide/Polychlorinated Biphenyls

TABLE 3-5

**SUMMARY OF ANALYSES PERFORMED ON SOIL BORING AND MONITORING WELL SOIL SAMPLES
CTO 280
ALAMEDA NAVAL AIR STATION**

Site	Field ID	Depth (feet)	Analysis (Method)										Pest/ Cyanide (CLP)	Pest (CLP)	Geotech Analysis
			VOC (CLP)	SVOCs (CLP)	TPH-Purg MOD 8015	TPH-Extr MOD 8015	Metals (CLP)	General Chemicals	TOC/ COD	EDB	Radionuclides				
1	M003-E	0.0		X	X	X	X								
		2.5	X	X	X	X	X				X				
		5.0	X	X	X	X	X				X				
		11.5													X
	M003-B	0.0		X	X	X	X				X				
		2.5	X	X	X	X	X				X				
		3.5													X
		5.0	X	X	X	X	X				X				
	M030-A	0.0		X	X	X	X				X				
		2.5	X	X	X	X	X				X				
		4.0													
		5.0	X	X	X	X	X				X				
		8.5													X
	M030-E	0.0		X	X	X	X				X				
		2.5	X	X	X	X	X	X			X				X
		5.0	X	X	X	X	X	X			X				
		14.0													X
	M030-C	0.0		X	X	X	X				X				
		2.5	X	X	X	X	X				X				
		4.5													X
		5.0	X	X	X	X	X				X				

TABLE 3-5

SUMMARY OF ANALYSES PERFORMED ON SOIL BORING AND MONITORING WELL SOIL SAMPLES
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

Site	Field ID	Depth (feet)	Analysis (Method)											Geotech Analysis	
			VOC (CLP)	SVOCs (CLP)	TPH-Purg MOD 8015	TPH-Extr MOD 8015	Metals (CLP)	General Chemicals	TOC/ COD	EDB	Radionuclides	Pest/PCB (CLP)	Pest (CLP)		Cyanide (CLP)
1 (Cont.)	M031-A	0.0		X	X	X	X	X							X
		2.5	X	X	X	X	X	X							X
		5.0	X	X	X	X	X	X							X
	M031-E	0.0		X	X	X	X			X					X
		2.5	X	X	X	X	X			X					X
		5.0	X	X	X	X	X			X					X
	M031-C	0.0		X	X	X	X			X					X
		2.5	X	X	X	X	X			X					X
		5.0	X	X	X	X	X			X					X
	M032-A	0.0		X	X	X	X								X
		2.5	X	X	X	X	X								X
		5.0	X	X	X	X	X								X
	M033-A	0.0		X	X	X	X			X					X
		2.5	X	X	X	X	X			X					X
		5.0	X	X	X	X	X			X					X
	M034-A	0.0		X	X	X	X			X					X
		2.5	X	X	X	X	X			X					X
		5.0	X	X	X	X	X			X					X
	M035-A	0.0		X	X	X	X			X					X
		2.5	X	X	X	X	X			X					X
		5.0	X	X	X	X	X								X

TABLE 3-5

SUMMARY OF ANALYSES PERFORMED ON SOIL BORING AND MONITORING WELL SOIL SAMPLES
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

Site	Field ID	Depth (feet)	Analysis (Method)										Pest/PCB (CLP)	Pest (CLP)	Cyanide (CLP)	Geotech Analysis
			VOC (CLP)	SVOCs (CLP)	TPH-Purg MOD 8015	TPH-Extr MOD 8015	Metals (CLP)	General Chemicals	TOC/ COD	EDB	Radionuclides					
1 (Cont.)	M028-C	0.0		X	X	X	X					X				
		2.5	X	X	X	X	X					X				
		5.0	X	X	X	X	X					X				
2	M016-B	0.0	X	X	X	X	X					X				
		2.5	X	X	X	X	X					X				
		5.0	X	X	X	X	X					X				
		6.5													X	
	M016-E	0.0		X	X	X	X					X				
		2.5	X	X	X	X	X					X				
		5.0	X	X	X	X	X					X				
		6.5													X	
		14.0													X	
	M023-C	0.0		X	X	X			X							
		3.0	X	X	X	X			X							
		5.0	X	X	X	X			X							
		6.0													X	
Runway Area	M101-C	0.0		X	X	X	X		X							
		2.5	X	X	X	X	X		X							
		5.0	X	X	X	X	X		X							

TABLE 3-5

SUMMARY OF ANALYSES PERFORMED ON SOIL BORING AND MONITORING WELL SOIL SAMPLES
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

[illegible]

TABLE 3-5

SUMMARY OF ANALYSES PERFORMED ON SOIL BORING AND MONITORING WELL SOIL SAMPLES
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

Site	Field ID	Depth (feet)	Analysis (Method)										Cyanide (CLP)	Geotech Analysis
			VOC (CLP)	SVOCs (CLP)	TPH-Purg MOD 8015	TPH-Extr MOD 8015	Metals (CLP)	General Chemicals	TOC/ COD	EDB	Radionuclides	Pest/PCB (CLP)	Pest (CLP)	
Runway Area (Cont.)	M117-E	0.0		X	X	X	X							
		2.5	X	X	X	X	X							
		3.5												X
		5.0	X	X	X	X	X							
		10.0												X
3	CPT-S03-01	0.0	X		X	X	X			X				
		2.5	X		X	X	X			X				
		5.0	X		X	X	X			X				
	M03-04	0.0	X		X	X	X			X				
		2.5	X		X	X	X			X				
		5.0	X		X	X	X			X				
		10.0	X		X	X	X							
	M03-05	0.0	X		X	X	X			X				
		2.5	X		X	X	X		X	X				
		5.0	X		X	X	X			X				
	M03-06	0.0			X	X	X			X				
		2.5	X		X	X	X			X				
		5.0	X		X	X	X			X				
	M03-07	0.0	X		X	X	X							
		2.5	X		X	X	X		X					
		5.0	X		X	X	X							

TABLE 3-5

SUMMARY OF ANALYSES PERFORMED ON SOIL BORING AND MONITORING WELL SOIL SAMPLES
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

Site	Field ID	Depth (feet)	Analysis (Method)												Geotech Analysis
			VOC (CLP)	SVOCs (CLP)	TPH-Purg MOD 8015	TPH-Extr MOD 8015	Metals (CLP)	General Chemicals	TOC/ COD	EDB	Radionuclides	Pest/PCB (CLP)	Pest (CLP)	Cyanide (CLP)	
3 (Cont.)	M03-08	0.0	X		X	X	X								
		2.5	X		X	X	X								
		5.0	X		X	X	X								
6	B06-20	0.0	X	X			X								
		2.5	X	X			X								
		5.0	X	X			X		X						
		10.0	X	X			X								
		14.0	X	X			X								
	B06-21	0.0	X	X			X								
		2.5	X	X			X								
		5.0	X	X			X								
		10.0	X	X			X		X						
		14.0	X	X			X								
	B06-22	0.0	X	X			X								
		2.5	X	X			X								
		5.0	X	X			X								
		10.0	X	X			X								
		14.0	X	X			X								

TABLE 3-5

SUMMARY OF ANALYSES PERFORMED ON SOIL BORING AND MONITORING WELL SOIL SAMPLES
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

Analysis (Method)															
Site	Field ID	Depth (feet)	VOC (CLP)	SVOCs (CLP)	TPH-Purg MOD 8015	TPH-Extr MOD 8015	Metals (CLP)	General Chemicals	TOC/ COD	EDB	Radionuclides	Pest/PCB (CLP)	Pest (CLP)	Cyanide (CLP)	Geotech Analysis
6 (Cont.)	B06-23	0.0	X	X			X								
		2.5	X	X			X								
		5.0	X	X			X								
		10.0	X	X			X								
		14.0	X	X			X								
	M06-06	0	X	X			X		X						
		2.5	X	X			X		X						
		5.0	X	X			X		X						
		10.0	X	X			X		X						
		14.0	X	X			X		X						
7A	B07A-10	0.0					X		X						
		2.5					X		X						
		7.0					X		X						
		13.0					X		X						
	B07A-11	0.0					X		X						
		2.5					X		X						
		7.0					X		X						
		13.0					X		X						

TABLE 3-5

**SUMMARY OF ANALYSES PERFORMED ON SOIL BORING AND MONITORING WELL SOIL SAMPLES
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)**

Analysis (Method)															
Site	Field ID	Depth (feet)	VOC (CLP)	SVOCs (CLP)	TPH-Purg MOD 8015	TPH-Extr MOD 8015	Metals (CLP)	General Chemicals	TOC/ COD	EDB	Radionuclides	Pest/PCB (CLP)	Pest (CLP)	Cyanide (CLP)	Geotech Analysis
7A (Cont.)	B07A-12	0.0					X		X						
		2.5					X		X						
		7.0					X		X						
		13.0					X		X						
		5.0					X		X						
	M07A-08	0.0	X		X	X	X		X						
		2.5	X		X	X	X		X						
		5.0	X		X	X	X		X						
	M07A-09	0.0	X		X	X	X		X						
		2.5	X		X	X	X		X						
		5.0	X		X	X	X		X						
7B & 11	B07B-04	0.0		X	X	X	X		X				X		
		2.5	X	X	X	X	X		X				X		
		5.0	X	X	X	X	X		X				X		
	B07B-05	0.0		X	X	X	X		X				X		
		2.5	X	X	X	X	X		X				X		
		5.0	X	X	X	X	X		X				X		
	B11-08	0.0			X	X	X		X						
		2.5	X		X	X	X		X						
		5.0	X		X	X	X		X						

SUMMARY OF ANALYSES PERFORMED ON SOIL BORING AND MONITORING WELL SOIL SAMPLES
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

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TABLE 3-5

**SUMMARY OF ANALYSES PERFORMED ON SOIL BORING AND MONITORING WELL SOIL SAMPLES
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)**

Site	Field ID	Depth (feet)	Analysis (Method)										Pest/PCB (CLP)	Pest (CLP)	Cyanide (CLP)	Geotech Analysis
			VOC (CLP)	SVOCs (CLP)	TPH-Purg MOD 8015	TPH-Extr MOD 8015	Metals (CLP)	General Chemicals	TOC/ COD	EDB	Radionuclides					
7B & 11 (Cont.)	M11-06	0.0		X	X	X	X									
		2.5	X	X	X	X	X									
		3.5														X
		5.0	X	X	X	X	X									
		10.0														X
7C	B7C-11	0.0	X	X							X					
		2.5	X	X	X	X	X				X					
		5.0	X	X	X	X	X				X					
	B7C-12	0.0	X	X	X	X	X				X					
		2.5	X	X	X	X	X				X					
		5.0	X	X	X	X	X				X					
	B7C-13	0.0	X	X	X	X	X				X					
		2.5	X	X	X	X	X				X					
		5.0	X	X	X	X	X				X					
	B7C-14	0.0	X	X	X	X	X				X					
		2.5	X	X	X	X	X				X					
		5.0	X	X	X	X	X				X					
	B7C-15	0.0	X	X	X	X	X				X					
		2.5	X	X	X	X	X				X					
		5.0	X	X	X	X	X				X					

TABLE 3-5

SUMMARY OF ANALYSES PERFORMED ON SOIL BORING AND MONITORING WELL SOIL SAMPLES
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

Analysis (Method)															
Site	Field ID	Depth (feet)	VOC (CLP)	SVOCs (CLP)	TPH-Purg MOD 8015	TPH-Extr MOD 8015	Metals (CLP)	General Chemicals	TOC/ COD	EDB	Radionuclides	Pest/PCB (CLP)	Pest (CLP)	Cyanide (CLP)	Geotech Analysis
7C (Cont.)	M07C-06	0.0	X	X	X	X	X				X				
		2.5	X	X	X	X	X			X					
		5.0	X	X	X	X	X			X					
	M07C-07	0.0	X	X	X	X	X				X				
		2.5	X	X	X	X	X				X				
		5.0	X	X	X	X	X				X				
	M07C-08	0.0	X	X	X	X	X				X				
		2.5	X	X	X	X	X				X				
		5.0	X	X	X	X	X				X				
	M07C-09	0.0	X	X	X	X	X				X				
		2.5	X	X	X	X	X				X				
		3.5													X
		5.0	X	X	X	X	X				X				
		10.5													X
	9	CPT-S09-05	0.0	X				X							
2.5			X				X								
5.0			X				X								
	CPT-S09-06	0.0	X				X								
		2.5	X				X								
		5.0	X				X								

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TABLE 3-5

SUMMARY OF ANALYSES PERFORMED ON SOIL BORING AND MONITORING WELL SOIL SAMPLES
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

Analysis (Method)																
Site	Field ID	Depth (feet)	VOC (CLP)	SVOCs (CLP)	TPH-Purg MOD 8015	TPH-Extr MOD 8015	Metals (CLP)	General Chemicals	TOC/ COD	EDB	Radionuclides	Pest/PCB (CLP)	Pest (CLP)	Cyanide (CLP)	Geotech Analysis	
10B (Cont.)	B10B-05	0.0	X	X												
		2.5	X	X												
		5.0	X	X												
	B10B-06	0.0	X	X												
		2.5	X	X												
		5.0	X	X												
	B10B-07	0.0	X	X	X	X										
		2.5	X	X	X	X										
		5.0	X	X	X	X										
	M10B-01	10.0	X	X	X	X										
		12.5	X	X	X	X										
		15.0	X	X	X	X										
13	B13-28	0.0	X		X	X	X									
		2.5	X		X	X	X									
		5.0	X		X	X	X									
	B13-29	0.0	X		X	X	X									
		2.5	X		X	X	X									
		5.0	X		X	X	X									
	B13-30	0.0	X		X	X	X									
		2.5	X		X	X	X									
		5.0	X		X	X	X									

TABLE 3-5

SUMMARY OF ANALYSES PERFORMED ON SOIL BORING AND MONITORING WELL SOIL SAMPLES
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

Site	Field ID	Depth (feet)	Analysis (Method)												
			VOC (CLP)	SVOCs (CLP)	TPH-Purg MOD 8015	TPH-Extr MOD 8015	Metals (CLP)	General Chemicals	TOC/ COD	EDB	Radionuclides	Pest/PCB (CLP)	Pest (CLP)	Cyanide (CLP)	Geotech Analysis
13 (Cont.)	B13-31	0.0	X		X	X	X								
		2.5	X		X	X	X								
		5.0	X		X	X	X								
	B13-32	0.0			X	X	X								
		2.5	X		X	X	X								
		5.0	X		X	X	X								
	M13-06	0.0			X	X	X								
		2.5	X		X	X	X								
		5.0	X		X	X	X								
	M13-07	0.0			X	X	X								
		2.5	X		X	X	X								
		5.0	X		X	X	X		X						
	M13-08	0.0			X	X	X								
		2.5	X		X	X	X								
		5.0	X		X	X	X								
	M13-09	0.0	X		X	X	X								
		2.5	X		X	X	X								
		5.0	X		X	X	X								
16	B16-10	0.0	X	X			X					X		X	
		2.5	X	X			X					X		X	
		5.0	X	X			X					X		X	

SUMMARY OF ANALYSES PERFORMED ON SOIL BORING AND MONITORING WELL SOIL SAMPLES
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

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TABLE 3-5

**SUMMARY OF ANALYSES PERFORMED ON SOIL BORING AND MONITORING WELL SOIL SAMPLES
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)**

Notes:

CLP - Contract Laboratory Program

VOC - Volatile Organic Compounds

SVOC - Semivolatile Organic Compounds

TPH-Purg - Total Petroleum Hydrocarbons, purgeable

TPH-Extr - Total Petroleum Hydrocarbons, extractable

MOD 8015 - Modified EPA Method 8015

COD - Chemical Oxygen Demand

TOC - Total Organic Carbon

EDB - Ethylene Dibromide

Pest/PCB - Pesticides/Polychlorinated Biphenyls

SAS - Special Analytical Services

General chemicals for soil samples include:

Total Organic Carbon

pH

%Moisture

TABLE 3-6

**SUMMARY OF ANALYSES PERFORMED ON GROUNDWATER SAMPLES
COLLECTED FROM MONITORING WELLS
CTO 280
ALAMEDA NAVAL AIR STATION**

Site	Field ID	Analysis (Method)											
		VOC (CLP)	SVOCs (CLP)	TPH-Purg MOD 8015	TPH-Extr MOD 8015	Metals (CLP)	General Chemicals	Radionuclides	TOC/ COD	Sulfide	Pest/PCB	EDB	Cyanide
1	M001-A	X	X			X	X	X	X				
	M001-B	X	X			X	X	X	X				
	M001-E	X	X			X	X	X	X	X			
	M002-A	X	X			X	X	X	X				
	M002-E	X	X			X	X	X	X				
	M003-A	X	X			X	X	X	X				
	M003-E	X	X			X	X	X	X				
	M003-B	X	X			X	X	X	X				
	M004-A	X	X			X	X	X	X				
	M005-A	X	X			X	X	X	X				
	M006-A	X	X			X	X	X	X				
	M007-A	X	X			X	X	X	X				
	M007-C	X	X			X	X	X	X	X			
	M025-A	X	X			X	X	X	X				
	M025-E	X	X			X	X	X	X				
	M025-C	X	X			X	X	X	X				
	M026-A	X	X			X	X	X	X				
	M026-E	X	X			X	X	X	X				
	M027-A	X	X			X	X	X	X				
	M027-E	X	X			X	X	X	X				

TABLE 3-6

**SUMMARY OF ANALYSES PERFORMED ON GROUNDWATER SAMPLES
COLLECTED FROM MONITORING WELLS**

CTO 280

ALAMEDA NAVAL AIR STATION

(Continued)

Site	Field ID	Analysis (Method)											
		VOC (CLP)	SVOCs (CLP)	TPH-Purg MOD 8015	TPH-Extr MOD 8015	Metals (CLP)	General Chemicals	Radionuclides	TOC/ COD	Sulfide	Pest/PCB	EDB	Cyanide
1 (Cont.)	M027-C	X	X			X	X	X	X				
	M028-A	X	X			X	X	X	X	X			
	M028-E	X	X			X	X	X	X				
	M028-C	X	X			X	X	X	X				
	M029-A	X	X			X	X	X	X				
	M029-E	X	X			X	X	X	X				
	M030-A	X	X			X	X	X	X				
	M030-E	X	X			X	X	X	X				
	M030-C	X	X			X	X	X	X				
	M031-A	X	X			X	X	X	X				
	M031-E	X	X			X	X	X	X	X			
	M031-C	X	X			X	X	X	X				
	M032-A	X	X			X	X	X	X				
	M033-A	X	X			X	X	X	X				
	M034-A	X	X			X	X	X	X				
	M035-A	X	X			X	X	X	X				

TABLE 3-6

**SUMMARY OF ANALYSES PERFORMED ON GROUNDWATER SAMPLES
COLLECTED FROM MONITORING WELLS
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)**

Analysis (Method)													
Site	Field ID	VOC (CLP)	SVOCs (CLP)	TPH-Purg MOD 8015	TPH-Extr MOD 8015	Metals (CLP)	General Chemicals	Radionuclides	TOC/ COD	Sulfide	Pest/PCB	EDB	Cyanide
2	M010-B	X	X			X	X	X	X		X		
	M011-A	X	X			X	X	X	X		X		
	M012-B	X	X			X	X	X	X		X		
	M013-C	X	X			X	X	X	X		X		
	M016-A	X	X			X	X	X	X	X	X		
	M016-E	X	X			X	X	X	X		X		
	M016-B	X	X			X	X	X	X		X		
	M020-B	X	X			X	X	X	X		X		
	M021-A	X	X			X	X	X	X		X		
	M021-E	X	X			X	X	X	X		X		
	M021-C	X	X			X	X	X	X		X		
	M022-A	X	X			X	X	X	X		X		
	M022-E	X	X			X	X	X	X		X		
	M023-A	X	X			X	X	X	X		X		
	M023-E	X	X			X	X	X	X		X		
	M023-C	X	X			X	X	X	X		X		
	M023-B	X	X			X	X	X	X	X	X		
	M024-A	X	X			X	X	X	X		X		
	M024-E	X	X			X	X	X	X		X		

**SUMMARY OF ANALYSES PERFORMED ON GROUNDWATER SAMPLES
COLLECTED FROM MONITORING WELLS
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)**

[illegible]

TABLE 3-6

SUMMARY OF ANALYSES PERFORMED ON GROUNDWATER SAMPLES
COLLECTED FROM MONITORING WELLS
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

Analysis (Method)													
Site	Field ID	VOC (CLP)	SVOCs (CLP)	TPH-Purg MOD 8015	TPH-Extr MOD 8015	Metals (CLP)	General Chemicals	Radionuclides	TOC/ COD	Sulfide	Pest/PCB	EDB	Cyanide
3	MW97-1	X	X	X	X	X	X		X			X	
	MW97-2	X	X	X	X	X	X		X			X	
	MW97-3	X	X	X	X	X	X		X			X	
	M03-04	X	X	X	X	X	X		X			X	
	M03-05	X	X	X	X	X	X		X			X	
	M03-06	X	X	X	X	X	X		X			X	
	M03-07	X	X	X	X	X	X					X	
	M03-08A	X	X	X	X	X	X	X	X			X	
	D03-01	X				X	X	X				X	
6	M06-01	X	X	X	X	X	X		X	X	X		
	M06-02	X	X	X	X	X	X		X		X		
	M06-03	X	X	X	X	X	X		X		X		
	M06-04	X	X	X	X	X	X		X		X		
	M06-05	X	X	X	X	X	X		X		X		
	M06-06	X	X	X	X	X	X		X		X		
7A	W-1	X	X	X	X	X	X		X		X		
	W-2	X	X	X	X	X	X		X		X		

TABLE 3-6

**SUMMARY OF ANALYSES PERFORMED ON GROUNDWATER SAMPLES
COLLECTED FROM MONITORING WELLS
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)**

Site	Field ID	Analysis (Method)											
		VOC (CLP)	SVOCs (CLP)	TPH-Purg MOD 8015	TPH-Extr MOD 8015	Metals (CLP)	General Chemicals	Radionuclides	TOC/ COD	Sulfide	Pest/PCB	EDB	Cyanide
7A (Cont.)	W-3	X	X	X	X	X	X		X		X		
	M07A-01	X	X	X	X	X	X		X		X		
	M07A-02	X	X	X	X	X	X		X		X		
	M07A-03	X	X	X	X	X	X		X		X		
	M07A-04	X	X	X	X	X	X		X		X		
	M07A-05	X	X	X	X	X	X		X		X		
	M07A-06	X	X	X	X	X	X		X		X		
	M07A-07	X	X	X	X	X	X		X		X		
	M07A-08	X	X	X	X	X	X		X		X		
	M07A-09	X	X	X	X	X	X		X		X		
	D07A-01	X		X	X	X	X		X				
	D07A-02	X		X	X	X	X		X				
	D07A-03	X		X	X	X	X		X				
7B & 11	M07B-01	X	X	X	X	X	X		X		X		
	M11-01	X	X	X	X	X	X		X		X		
	M11-02	X	X	X	X	X	X		X		X		
	M11-03	X	X	X	X	X	X		X		X		
	M11-04	X	X	X	X	X	X		X		X		

TABLE 3-6

**SUMMARY OF ANALYSES PERFORMED ON GROUNDWATER SAMPLES
COLLECTED FROM MONITORING WELLS**

CTO 280

ALAMEDA NAVAL AIR STATION

(Continued)

Site	Field ID	Analysis (Method)											
		VOC (CLP)	SVOCs (CLP)	TPH-Purg MOD 8015	TPH-Extr MOD 8015	Metals (CLP)	General Chemicals	Radionuclides	TOC/ COD	Sulfide	Pest/PCB	EDB	Cyanide
7B & 11 (Cont.)	M11-05	X	X	X	X	X	X		X		X		
	M11-06	X	X	X	X	X	X		X		X		
7C	MW547-1	X	X	X	X	X	X		X			X	
	MW547-2	X	X	X	X	X	X		X			X	
	MW547-3	X	X	X	X	X	X		X			X	
	MW547-4	X	X	X	X	X	X		X			X	
	MW547-5	X	X	X	X	X	X		X			X	
	M07C-06	X	X	X	X	X	X		X			X	
	M07C-07	X	X	X	X	X	X		X			X	
	M07C-08	X	X	X	X	X	X		X	X		X	
	M07C-09	X	X	X	X	X	X		X			X	
9	MW410-1	X	X	X	X	X	X		X	X			
	MW410-2	X	X	X	X	X	X		X				
	MW410-3	X	X	X	X	X	X		X				
	MW410-4	X	X	X	X	X	X		X				
	M09-05	X	X	X	X	X	X		X				
	M09-06	X	X	X	X	X	X		X				

TABLE 3-6

**SUMMARY OF ANALYSES PERFORMED ON GROUNDWATER SAMPLES
COLLECTED FROM MONITORING WELLS
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)**

Site	Field ID	Analysis (Method)											
		VOC (CLP)	SVOCs (CLP)	TPH-Purg MOD 8015	TPH-Extr MOD 8015	Metals (CLP)	General Chemicals	Radionuclides	TOC/ COD	Sulfide	Pest/PCB	EDB	Cyanide
9 (Cont.)	D09-01	X	X			X	X		X				
10B	MW530-1	X	X	X	X	X	X		X				
	MW530-2	X	X	X	X	X	X		X				
	MW530-3	X	X	X	X	X	X		X				
	M10B-01	X	X	X	X	X	X		X				
	D10B-01	X	X	X	X	X	X		X				
	D10B-02	X	X	X	X	X	X		X	X			
13	M13-06	X	X	X	X	X	X		X		X		
	M13-07	X	X	X	X	X	X		X		X		
	M13-08	X	X	X	X	X	X		X	X	X		
	M13-09	X	X	X	X	X	X		X		X		
	MW-1	X	X	X	X	X	X		X		X		
	MWOR-1	X	X	X	X	X	X		X		X		
	MWOR-2	X	X	X	X	X	X		X		X		
	MWOR-3	X	X	X	X	X	X		X		X		
	MWOR-4	X	X	X	X	X	X		X		X		

TABLE 3-6

SUMMARY OF ANALYSES PERFORMED ON GROUNDWATER SAMPLES
COLLECTED FROM MONITORING WELLS
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

Analysis (Method)													
Site	Field ID	VOC (CLP)	SVOCs (CLP)	TPH-Purg MOD 8015	TPH-Extr MOD 8015	Metals (CLP)	General Chemicals	Radionuclides	TOC/ COD	Sulfide	Pest/PCB	EDB	Cyanide
13 (Cont.)	MWOR-5	X	X	X	X	X	X		X		X		
	D13-01	X	X			X	X		X		X		
15	M15-01	X	X	X	X	X	X		X	X	X		
	M15-03	X	X	X	X	X	X		X		X		
16	MWC2-1	X	X			X	X		X		X**		X
	MWC2-2	X	X			X	X		X		X		X
	MWC2-3	X	X	X	X	X	X		X		X		X
	M16-04	X	X			X	X		X		X		X
19	MWD13-1	X	X	X	X	X					X		X
	MWD13-2	X	X	X	X	X	X		X		X		X
	MWD13-3	X	X	X	X	X	X		X		X		X
	MWD13-4	X	X	X	X	X	X		X		X		X
	M19-05	X	X	X	X	X	X		X				X
	D19-01	X	X			X	X		X	X			

TABLE 3-6

**SUMMARY OF ANALYSES PERFORMED ON GROUNDWATER SAMPLES
COLLECTED FROM MONITORING WELLS
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)**

Notes:

CLP - Contract Laboratory Program

VOC - Volatile Organic Compounds

SVOC - Semivolatile Organic Compounds

COD - Chemical Oxygen Demand

TOC - Total Organic Carbon

TPH-Extr - Total Petroleum Hydrocarbon, extractable

TPH-Purg - Total Petroleum Hydrocarbon, purgeable

MOD 8015 - Modified EPA Method 8015

Pest/PCB - Pesticide/Polychlorinated Biphenyls

EDB - Ethylene Dibromide

* - Data not received from laboratory.

** - PCB analysis only.

Metal samples were filtered in the field with a 0.45 micron micropore membrane filter.

General chemicals for groundwater samples include:

Total Dissolved Solids

Alkalinity

Acidity

Chemical Oxygen Demand

Sulfate

Sulfide

Chloride

Fluoride

pH

Hardness

Nitrate/Nitrite

Total Organic Carbon

TABLE 3-7

**SUMMARY OF SHALLOW MONITORING WELL CONSTRUCTION
CTO 280
ALAMEDA NAVAL AIR STATION**

Site	Well ID	Total Depth of Borehole (feet bgs)	Total Depth of Wells (feet bgs)	Well Diameter (inches)	Screen Interval/Length (feet)	Blank Casing Interval/Length (feet)	Filter Pack Interval/Thickness (feet)	Bentonite Seal Interval/Thickness (feet)	Cement Grout Interval/Thickness (feet)
1	M003-E	22.0	21.5	2.0	11.25-21.25/10.0	0.0-11.25/11.25	9.25-21.25/12.0	7.25-9.25/2.0	0.0-7.25/7.25
	M028-E*	21.0	21.0	2.0	11.0-21.0/10.0	0.0-11.0/11.0	9.0-21.0/12.0	7.0-9.0/2.0	0.0-7.0/7.0
	M030-A	12.5	12.5	2.0	2.5-12.5/10.0	0.0-2.5/2.5	2-12.5/10.5	1.0-2.0/1.0	0.0-1.0/1.0
	M030-E	16.0	16.0	2.0	6.0-16.0/10.0	0.0-6.0/6.0	4.0-16.0/12.0	2.0-4.0/2.0	0.0-2.0/2.0
	M031-A	12.5	12.5	2.0	2.5-12.5/10.0	0.0-2.5/2.5	2.0-12.5/10.5	1.5-2.0/0.5	0.0-1.5/1.5
	M031-E	19.5	18.0	2.0	8.0-18.0/10.0	0.0-8.0/8.0	6.0-18.0/12.0	4.0-6.0/2.0	0.0-4.0/4.0
	M032-A	12.5	12.5	2.0	2.5-12.5/10.0	0.0-2.5/2.5	2.0-12.5/10.5	1.2-2.0/0.5	0.0-1.5/1.5
	M033-A	12.5	12.5	2.0	4.25-12.5/8.25	0.0-4.25/4.25	2.5-12.5/10.5	1.5-2.5/1.0	0.0-1.5/1.5
	M034-A	12.5	12.5	2.0	4.25-12.5/8.25	0.0-4.25/4.25	2.5-12.5/10.5	1.5-2.5/1.0	0.0-1.5/1.5
	M035-A	14.0	14.0	2.0	4.0-14.0/10.0	0.0-4.0/4.0	2.5-14.0/11.5	1.5-2.5/1.0	0.0-1.5/1.5
2	M016-E	24.5	24.0	2.0	14.0-24.0/10.0	0.0-14.0/14.0	12.0-24.0/12.0	10.0-12.0/2.0	0.0-10.0/10.0
Runway Area	M101-A*	12.5	12.5	2.0	2.5-12.5/10.0	0.0-2.5-2.5	2.0-12.5/10.5	1.5-2.0/0.5	0.0-1.5/1.5
	M112-A	12.5	12.5	2.0	2.5-12.5/10.0	0.0-2.5/2.5	2.0-12.5/10.5	1.0-2.0/1.0	0.0-1.0/1.0
	M113-A	12.0	12.0	2.0	2.0-12.0/10.0	0.0-2.0/2.0	1.5-12.0/10.5	1.0-1.5/0.5	0.0-1.0/1.0
	M114-A	12.0	12.0	2.0	2.0-12.0/10.0	0.0-2.0/2.0	1.5-12.0/10.5	1.0-1.5/0.5	0.0-1.0/1.0
	M115-E	12.0	12.0	2.0	7.0-12.0/5.0	0.0-7.0/7.0	4.5-12.0/7.5	3.5-4.5/1.0	0.0-3.5/3.5
	M116-E	20.0	20.0	2.0	10.0-20.0/10.0	0.0-10.0/10.0	8.0-20.0/12.0	6.0-8.0/2.0	0.0-6.0/6.0
	M117-E	20.0	18.0	2.0	8.0-18.0/10.0	0.0-8.0/8.0	6.0-18.0/12.0	4.0-6.0/2.0	0.0-4.0/4.0

TABLE 3-7

SUMMARY OF SHALLOW MONITORING WELL CONSTRUCTION
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

Site	Well ID	Total Depth of Borehole (feet bgs)	Total Depth of Wells (feet bgs)	Well Diameter (inches)	Screen Interval/Length (feet)	Blank Casing Interval/Length (feet)	Filter Pack Interval/Thickness (feet)	Bentonite Seal Interval/Thickness (feet)	Cement Grout Interval/Thickness (feet)
3	M03-04	11.0	11.0	2.0	3.0-11.0/10.0	0.0-3.0/3.0	2.5-11.0/8.5	1.5-2.5/1.0	0.0-1.5/1.5
	M03-05	13.0	13.0	2.0	3.0-13.0/10.0	0.0-3.0/3.0	2.5-13.0/10.5	2.0-2.5/0.5	0.0-2.0/2.0
	M03-06	12.0	12.0	2.0	3.0-12.0/9.0	0.0-3.0/3.0	2.5-12.0/9.5	1.5-2.5/1.0	0.0-1.5/1.5
	M03-07	13.0	13.0	2.0	3.0-13.0/10.0	0.0-3.0/3.0	2.5-13.0/10.5	2.0-2.5/0.5	0.0-2.0/2.0
	M03-08	13.0	13.0	2.0	3.0-13.0/10.0	0.0-3.0/3.0	2.5-13.0/10.5	2.0-2.5/0.5	0.0-2.0/2.0
5	M05-11	15.5	15.5	2.0	5.5-15.5/10.0	0.0-5.5/5.5	4.0-15.5/11.5	3.0-4.0/1.0	0.0-3.0/3.0
	M05-12	15.5	15.5	2.0	5.5-15.5/10.0	0.0-5.5/5.5	4.0-15.5/11.5	3.0-4.0/1.0	0.0-3.0/3.0
6	M06-06	15.0	13.0	2.0	3.0-13.0/10.0	0.0-3.0/3.0	2.0-15.0/13.0	1.0-2.0/1.0	0.0-1.0/1.0
7A	M07A-08	11.0	11.0	2.0	2.5-11/8.5	0.0-2.5/2.5	2.0-11.0/9.0	1.5-2.0/0.5	0.0-1.5/1.5
	M07A-09	11.0	11.0	2.0	2.5-11/8.5	0.0-2.5/2.5	2.0-11.0/9.0	1.5-2.0/0.5	0.0-1.5/1.5
7B & 11	M11-05	14.0	14.0	2.0	4.0-14.0/10.0	0.0-4.0/4.0	2.5-14.0/11.5	1.5-2.5/1.0	0.0-1.5/1.5
	M11-06	14.0	14.0	2.0	4.0-14.0/10.0	0.0-4.0/4.0	2.5-14.0/11.5	1.5-2.5/1.0	0.0-1.5/1.5
7C	M07C-06	14.0	14.0	2.0	4.0-14.0/10.0	0.0-4.0-4.0	2.5-14.0/11.5	1.5-2.5/1.0	0.0-1.5/1.5
	M07C-07	13.5	13.5	2.0	3.5-13.5/10.0	0.0-3.5/3.5	2.0-13.5/11.5	1.0-2.0/1.0	0.0-1.0/1.0
	M07C-08	13.5	13.5	2.0	3.5-13.5/10.0	0.0-3.5/3.5	2.0-13.5/11.5	1.0-2.0/1.0	0.0-1.0/1.0

TABLE 3-7

SUMMARY OF SHALLOW MONITORING WELL CONSTRUCTION
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

Site	Well ID	Total Depth of Borehole (feet bgs)	Total Depth of Wells (feet bgs)	Well Diameter (inches)	Screen Interval/Length (feet)	Blank Casing Interval/Length (feet)	Filter Pack Interval/Thickness (feet)	Bentonite Seal Interval/Thickness (feet)	Cement Grout Interval/Thickness (feet)
7C (Cont.)	M07C-09	14.0	14.0	2.0	4.0-14.0/10.0	0.0-4.0/4.0	2.5-14.0/11.5	1.5-2.5/1.0	0.0-1.5/1.5
9	M09-05	14.0	14.0	2.0	3.5-13.5/10.0	0.0-3.5/3.5	3.0-14.0/11.0	2.0-3.0/1.0	0.0-2.0/2.0
	M09-06	14.0	14.0	2.0	4.0-14.0/10.0	0.0-4.0/4.0	3.5-14.0/10.5	2.5-3.5/1.0	0.0-2.5/2.5
10B	M10B-01	11.0	11.0	2.0	3.0-11.0/8.0	0.0-3.0/3.0	2.5-11.0/8.5	2.0-2.5/0.5	0.0-2.0/2.0
13	M13-06	11.25	9.75	2.0	2.0-9.75/7.75	0.0-2.0/2.0	1.5-9.75/8.25	1.0-1.5/0.5	0.0-1.0/1.0
	M13-07	13.0	1.5	2.0	2.5-12.5/10.0	0.0-2.5/2.5	2.5-13.0/10.5	1.0-2.5/1.5	0.0-1.0/1.0
	M13-08	32.0	32.0	2.0	22.0-32.0/10.0	0.0-22.0/22.0	20.0-32.0/12.0	18.0-20.0/2.0	0.0-18.0/18.0
	M13-09	13.0	12.5	2.0	2.5-12.5/10.0	0.0-2.5/2.5	2.0-13.0/11.0	1.5-2.0/0.5	0.0-1.5/1.5
16	M16-04	14.0	14.0	2.0	3.5-13.5/10.0	0.0-3.5/3.5	3.0-14.0/11.0	2.0-3.0/1.0	0.0-2.0/2.0
19	M19-05	30.0	30.0	2.0	20.0-30.0/10.0	0.0-20.0/20.0	18.0-30.0/12.0	16.0-18.0/2.0	0.0-16.0/16.0

Note: *Monitoring well reinstalled because original well was destroyed by the Navy Construction Battalion.

TABLE 3-8

**SUMMARY OF DEEP MONITORING WELL CONSTRUCTION
CTO 280
ALAMEDA NAVAL AIR STATION**

Site	Well ID	Total Depth of Borehole (feet bgs)	Total Depth of Wells (feet bgs)	Well Diameter (inches)	Screen Interval/Length (feet)	Blank Casing Interval/Length (feet)	Filter Pack Interval/Thickness (feet)	Bentonite Seal Interval/Thickness (feet)	Cement Grout Interval/Thickness (feet)
1	M003-B	44.5	43.0	3.0	33.0-43.0/10.0	0.0-33.0/33.0	29.5-44.5/15.0	26.5-29.5/3.0	0.0-26.5/26.5
	M028-C	92.5	90.0	3.0	80.0-90.0/10.0	0.0-80.0/80.0	75.0-90.0/15.0	72.0-75.0/3.0	0.0-72.0/72.0
	M030-C	89.5	86.5	3.0	76.5-86.5/10.0	0.0-76.5-76.5	73.5-87.5/14.0	70.5-73.5/3.0	0.0-70.5/70.5
	M031-C	92.5	87.5	3.0	77.5-87.5/10.0	0.0-77.5/77.5	74.5-88.0/10.5	71.5-74.5/3.0	0.0-71.5/71.5
2	M016-B	56.0	55.5	3.0	45.5-55.5/10.0	0.0-45.5/45.5	42.0-56.0/14.0	38.5-42.0/3.5	0.0-38.5/38.5
	M023-C	115.0	110.0	3.0	99.5-109.5/10.0	0.0-99.5/99.5	97.0-110.0/13.0	94.0-97.0/3.0	0.0-94.0/94.0
Runway Area	M101-C	70.0	65.0	3.0	48.5-58.5/10.0	0.0-48.5/48.5	45.0-60.0/15.0	43.0-45.0/2.0	0.0-43.0/43.0
	DRA-01	46.0	45.5	3.0	35.0-45.0/10.0	0.0-35.0/35.0	33.0-46.0/13.0	30.5-33.0/2.5	0.0-30.5/30.5
3	D03-01	61.0	60.0	3.0	49.5-59.5/10.0	0.0-49.5/49.5	46.5-60.5/14.0	43.0-46.5/3.5	0.0-43.0/43.0
7A	D07A-01	69.0	68.0	3.0	58.0-68.0/10.0	0.0-58.0/58.0	55.5-68.5/13.0	52.4-55.5/3.1	0.0-52.4/52.4
	D07A-02	60.3	60.0	3.0	50.0-60.0/10.0	0.0-50.0/50.0	48.3-60.2/11.9	45.3-48.3/3.0	0.0-45.3/45.3
	D07A-03	61.5	60.5	3.0	50.0-60.0/10.0	0.0-50.0/50.0	46.5-61.5/15.0	43.0-46.5/3.5	0.0-43.0/43.0
7B & 11	D11-01	61.5	60.0	3.0	50.0-60.0/10.0	0.0-50.0/50.0	45.5-61.5/16.0	41.5-45.5/4.0	0.0-41.5/41.5
7C	D07C-01	60.5	59.0	3.0	49.0-59.0/10.0	0.0-49.0/49.0	46.0-60.5/14.5	42.6-46.0/3.4	0.0-42.6/42.6
9	D09-01	61.0	60.5	3.0	50.0-60.0/10.0	0.0-50.0/50.0	46.6-61.0/14.4	44.3-46.6/2.3	0.0-44.3/44.3

TABLE 3-8

SUMMARY OF DEEP MONITORING WELL CONSTRUCTION
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

Site	Well ID	Total Depth of Borehole (feet bgs)	Total Depth of Wells (feet bgs)	Well Diameter (inches)	Screen Interval/Length (feet)	Blank Casing Interval/Length (feet)	Filter Pack Interval/Thickness (feet)	Bentonite Seal Interval/Thickness (feet)	Cement Grout Interval/Thickness (feet)
10B	D10B-01	61.5	61.5	3.0	50.0-60.0/10.0	0.0-50.0/50.0	46.5-61.5/15.0	44.0-46.5/2.5	0.0-44.0/44.0
	D10B-02	81.0	60.5	3.0	50.0-60.0/10.0	0.0-50.0/50.0	47.0-60.5/13.5	44.0-47.0/3.0	0.0-44.0/44.0
13	D13-01	101.5	60.0	3.0	50.0-60.0/10.0	0.0-50.0/50.0	48.6-63.0/14.4	44.6-48.6/4.0	0.0-44.6/44.6
19	D19-01	61.0	60.0	3.0	50.0-60.0/10.0	0.0-50.0/50.0	46.5-61.0/14.5	43.0-46.5/3.5	0.0-43.0/43.0

TABLE 3-9

**SUMMARY OF ANALYSES PERFORMED ON NON-POINT SOURCE SAMPLES
CTO 280
ALAMEDA NAVAL AIR STATION**

Site	Field ID	Analysis (Method)								
		VOC (CLP)	SVOCs (CLP)	TPH-Purg MOD 8015	TPH-Extr MOD 8015	Metals (CLP)	EDB	General Chemicals	Pest/PCB (CLP)	Cyanide (CLP)
3	NPS-S03-01	X	X	X	X	X	X			
	NPS-S03-02	X	X	X	X	X	X			
	NPS-S03-03	X	X	X	X	X	X			
	NPS-S03-04	X	X	X	X	X	X			
	NPS-S03-07	X	X	X	X	X	X			
6	NPS-S06-01	X	X	X	X	X	X			
	NPS-S06-02	X	X	X	X	X	X			
	NPS-S06-03	X	X	X	X	X	X			
7A	NPS-S07A-02	X	X	X	X	X				
	NPS-S07A-03	X	X	X	X	X				
7B & 11	NPS-S07B-01	X	X	X	X	X				
	NPS-S07B-02	X	X	X	X	X				
	NPS-S11-01	X	X	X	X	X				
7C	NPS-S07C-01	X	X	X	X	X	X			
9	NPS-S09-01	X	X	X	X	X				
	NPS-S09-02	X	X	X	X	X				

TABLE 3-9

SUMMARY OF ANALYSES PERFORMED ON NON-POINT SOURCE SAMPLES
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

Site	Field ID	Analysis (Method)								
		VOC (CLP)	SVOCs (CLP)	TPH-Purg MOD 8015	TPH-Extr MOD 8015	Metals (CLP)	EDB	General Chemicals	Pest/PCB (CLP)	Cyanide (CLP)
9 (Cont.)	NPS-S09-03	X	X	X	X	X				
10B	NPS-S10B-01	X	X	X	X	X				
	NPS-S10B-02	X	X	X	X	X				
13	NPS-S13-01*									
16	NPS-S16-01	X	X			X			X	X
	NPS-S16-02	X	X			X			X	X
19	NPS-S19-01	X	X	X	X	X				
	NPS-S19-02	X	X	X	X	X				

Notes:

VOC - Volatile Organic Compound

SVOC - Semivolatile Organic Compound

TPH-Purg - Total Petroleum Hydrocarbons, purgeable

TPH-Extr - Total Petroleum Hydrocarbons, extractable

MOD 8015 - Modified EPA Method 8015

CLP - Contract Laboratory Program

EDB - Ethylene Dibromide

Pest/PCB - Pesticide/Polychlorinated Biphenyls

General chemicals for soil samples include:

Total Organic Carbon

pH

%Moisture

* - No data received from laboratory.

TABLE 4-1
PERCENTAGE OF QUALIFIED DATA
FIRST QUARTER GROUNDWATER SAMPLES AND HYDROPUNCH SAMPLES
CTO 280
ALAMEDA NAVAL AIR STATION

Method	Percentage of Qualified Data at Estimated Concentrations							
	a	b	c	d	e	f	g	h
VOCs								
TAL	0.1	2.8	0.0	0.0	0.5	9.1	0.4	0.0
TICs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Aromatic Hydrocarbons	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SVOCs								
TAL	0.5	3.2	0.0	0.0	0.2	3.3	1.6	2.3
TICs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OC Pesticides and PCBs								
OC Pesticides/PCBs	77	0.0	0.0	0.0	0.0	3.5	0.0	1.3
PCBs (only)	100	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TPH-Purgeable	0.0	0.0	0.0	0.0	0.0	3.6	0.0	21
TPH-Extractable	0.6	0.0	0.0	0.0	0.0	5.5	0.0	24
Metals and Cyanide								
Metals	0.0	15	2.2	1.3	0.0	0.0	13	2.9
Cyanide	0.0	4.5	4.5	0.0	0.0	0.0	0.0	0.0
General Chemistry Characteristics								
Acidity	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Alkalinity	0.0	0.0	1.8	0.0	0.0	0.0	0.0	3.3
Conductivity	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0
Dissolved Oxygen	0.0	0.0	20	11	0.0	0.0	0.0	0.0
Hardness	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.4
Oil and Grease	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
pH	0.0	0.0	0.0	0.0	0.0	0.0	0.0	26
TDS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11
TOC	0.0	0.0	29	29	0.0	0.0	0.0	0.4
Total Sulfide	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Major Anions	0.0	0.0	9.1	0.0	0.0	0.0	0.0	1.6
Radionuclides	0.0	26	0.0	0.0	0.0	0.0	37	34

OC Pesticides - Organochlorine pesticide
PCB - Polychlorinated biphenyl
pH - Log of the hydrogen ion concentration
SVOC - Semivolatile organic compound
TAL - Target analyte list
TDS - Total dissolved solids
TIC - Tentatively identified compound
TOC - Total organic carbon
TPH - Total petroleum hydrocarbon
VOC - Volatile organic compound

a - Surrogate recovery outside control limits (accuracy)
b - Contamination found in the blank sample (accuracy)
c - Matrix spike recovery outside control limits (accuracy)
d - Duplicate relative response difference outside control limit (precision)
e - Internal standard recovery outside control limits (accuracy)
f - Calibration criteria not met (accuracy)
g - Quantification less than quantitation limit (accuracy)
h - All other qualifications

TABLE 4-2
PERCENTAGE OF QUALIFIED DATA SOIL SAMPLES
CTO 280
ALAMEDA NAVAL AIR STATION

Method	Percentage of Qualified Data at Estimated Concentrations							
	a	b	c	d	e	f	g	h
VOCs								
TAL	0.1	3.6	0.0	0.0	0.2	6.1	1.7	1.1
TICs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SVOCs								
TAL	0.3	4.3	0.0	0.0	1.0	2.9	4.4	0.6
TICs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OC Pesticides and PCBs	18	0.0	0.0	0.0	0.0	1.7	1.5	1.4
Dioxins/Furans	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TPH-Purgeable	9.9	0.0	0.0	0.0	0.0	4.0	0.0	13
TPH-Extractable	3.1	0.0	0.0	0.0	0.0	7.4	0.2	22
Metals and Cyanide								
Metals	0.0	8.5	5.5	3.2	0.0	1.1	16	3.1
Cyanide	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
General Chemistry Characteristics								
CEC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
pH	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.6
TOC	0.0	0.0	14	0.0	0.0	0.0	0.0	18

OC Pesticides - Organochlorine pesticide
PCB - Polychlorinated biphenyl
pH - Log of the hydrogen ion concentration
SVOC - Semivolatile organic compound
TAL - Target analyte list
TIC - Tentatively identified compound
TOC - Total organic carbon
TPH - Total petroleum hydrocarbon
VOC - Volatile organic compound

a - Surrogate recovery outside control limits
b - Contamination found in the blank sample
c - Matrix spike recovery outside control limits
d - Duplicate relative response difference outside control limit
e - Internal standard recovery outside control limits
f - Calibration criteria not met
g - Quantification less than quantitation limit
h - All other qualifications

TABLE 5-1
SUMMARY OF FIELD WORK FOR SITE 1
CTO 280
ALAMEDA NAVAL AIR STATION

Cone Penetrometer Testing	Shallow HydroPunch	Deep HydroPunch	Surface Soil Sampling	Shallow Wells	Deep Wells	Groundwater Sampling
CPT-S01-01	HP1-2-A	HP1-2-D	SS1-BA-01	M003-E	M028-C	M001-A
CPT-S01-02	HP1-2-E	HP1-5-D	SS1-BA-02	M030-A	M003-B	M001-B*
CPT-S01-04	HP1-5-A	HP1-8-D	SS1-BA-03	M030-E	M030-C	M001-E
CPT-S01-05	HP1-5-E	HP1-10-D	SS1-BA-04	M031-A	M031-C	M002-A
CPT-S01-06	HP1-8-A	HP1-11-D	SS1-BA-05	M031-E		M002-E
CPT-S01-07	HP1-8-E		SS1-RA-01	M032-A		M003-A
CPT-S01-08	HP1-10-A		SS1-RA-02	M033-A		M003-E
CPT-S01-10	HP1-10-E		SS1-RA-03	M034-A		M003-B
CPT-S01-11	HP1-11-A		SS1-RA-04	M035-A		M004-A
CPT-S01-12	HP1-11-E		SS1-RA-05			M005-A
			SS1-RA-06			M006-A
			SS1-RA-07			M007-A
			SS1-RA-08			M007-C*
			SS1-RA-09			M025-A
			SS1-RA-10			M025-E
			SS1-RA-11			M025-C*
			SS1-RA-12			M026-A
			SS1-RA-13			M026-E
			SS1-RA-14			M027-A
			SS1-RA-15			M027-E
			SS1-RA-16			M027-B*
			SS1-RA-17			M027-C*
			SS1-RA-18			M028-A
			SS1-RA-19			M028-E
			SS1-RA-20			M028-C
			SS1-RA-21			M029-A
			SS1-AA-01			M029-E
			SS1-AA-02			M030A
			SS1-AA-03			M030-E
						M030-C
						M031A
						M031-E
						M031-C
						M032-A
						M033-A
						M034-A
						M035-A

* Monitoring wells will be sampled during Quarter 1 and Quarter 3 only.

**SUMMARY OF SOIL ORGANIC CHEMICAL ANALYSES FROM SITE 1
CTO 280
ALAMEDA NAVAL AIR STATION**

WELL NO.	SAMPLE DATE	SAMPLE DEPTH (feet bgs)	USCS CLASSIFICATION ..	FIELD SCREEN (ppm/v) ...	VOLATILE ORGANIC COMPOUNDS (ug/kg)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/kg)	PESTICIDES, PCB'S AND DIOXINS (ug/kg)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/kg)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/kg)
M003-B	08/15/94	0.5	GW	0.0	NA	2-METHYLNAPHTHALENE: 540	NA	TPHC AS DIESEL: 420000J(h)	ND
M003-B	08/15/94	2.5	SP	0.0	ND	ND	NA	TPHC AS MOTOR OIL: 36000J(h)	ND
M003-B	08/15/94	4.5	SP	0.0	ND	ND	NA	ND	ND
M003-E	08/15/94	0.5	GM	0.0	NA	ND	NA	TPHC AS MOTOR OIL: 1390000J(h)	ND
M003-E	08/15/94	2.0	SP-SC	0.2	ND	ND	NA	TPHC AS DIESEL: 490000J(h)	ND
M003-E	08/15/94	4.5	SP	0.0	ND	ND	NA	ND	ND
M028-C	08/11/94	0.0	SW		NA	BENZO(A)ANTHRACENE: 540 BENZO(A)PYRENE: 550 BENZO(B)FLUORANTHENE: 710 CHRYSENE: 340 FLUORANTHENE: 720 PYRENE: 550	NA	TPHC AS MOTOR OIL: 150000J(h)	ND
M028-C	08/11/94	2.5	SW		ND	ND	NA	TPHC AS MOTOR OIL: 620000J(h)	ND
M028-C	08/11/94	5.0	SW		1,2-DICHLOROETHENE (TOTAL): 15	BENZO(A)ANTHRACENE: 1800 BENZO(A)PYRENE: 1700 BENZO(B)FLUORANTHENE: 2100 BENZO(K)FLUORANTHENE: 1100J(f) CHRYSENE: 1500 FLUORANTHENE: 1200 INDENO(1,2,3-CD)PYRENE: 780 PYRENE: 1200	NA	TPHC AS MOTOR OIL: 130000J(h)	ND

SUMMARY OF SOIL ORGANIC CHEMICAL ANALYSES FROM SITE 1
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

WELL NO.	SAMPLE DATE	SAMPLE DEPTH (feet bgs)	USCS CLASSIFICATION **	FIELD SCREEN (ppm/v) ***	VOLATILE ORGANIC COMPOUNDS (ug/kg)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/kg)	PESTICIDES, PCB'S AND DIOXINS (ug/kg)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/kg)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/kg)
M028-C DUP	08/11/94	0.0	SW		NA	BENZO(A)ANTHRACENE: 370 BENZO(A)PYRENE: 420 BENZO(B)FLUORANTHENE: 500 FLUORANTHENE: 480 PYRENE: 410	NA	TPHC AS MOTOR OIL: 130000J(h)	ND
M030-A	08/15/94	0.5	SM	0.0	NA	ND	NA	TPHC AS MOTOR OIL: 160000J(h)	ND
M030-A	08/15/94	2.0	SP	0.5	ND	ND	NA	TPHC AS MOTOR OIL: 1070000J(h)	ND
M030-A	08/15/94	4.5	GP	0.5	ND	ND	NA	TPHC AS MOTOR OIL: 68000J(h)	ND
M030-C	08/15/94	0.5	ML	0.0	NA	ND	NA	TPHC AS MOTOR OIL: 480000J(h)	ND
M030-C	08/15/94	2.0	SM	0.0	ND	ND	NA	TPHC AS MOTOR OIL: 90000J(h)	ND
M030-C	08/15/94	4.5	SP	0.0	ND	ND	NA	TPHC AS MOTOR OIL: 190000J(h)	ND
M030-E	08/15/94	0.5	SM	0.0	NA	ND	NA	ND	ND
M030-E	08/15/94	2.0	SP	0.0	ND	BENZO(B)FLUORANTHENE: 1900 CHRYSENE: 2400 FLUORANTHENE: 1900 PYRENE: 2000	NA	TPHC AS MOTOR OIL: 420000J(h)	ND
M030-E	08/15/94	4.5	SP	0.0	ND	ND	NA	ND	ND

SUMMARY OF SOIL ORGANIC CHEMICAL ANALYSES FROM SITE 1
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

WELL NO.	SAMPLE DATE	SAMPLE DEPTH (feet bgs)	USCS CLASSIFICATION	FIELD SCREEN (ppm/v)	VOLATILE ORGANIC COMPOUNDS (ug/kg)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/kg)	PESTICIDES, PCB'S AND DIOXINS (ug/kg)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/kg)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/kg)
M031-A	08/10/94	0.0	SM	0.0	NA	ND	NA	TPHC AS DIESEL: 95000J(a,h) TPHC AS JP5: 53000J(a,h) TPHC AS MOTOR OIL: 190000J(a,f,h)	ND
M031-A	08/10/94	2.5	SP	0.0	ND	ND	NA	ND	ND
M031-A	08/10/94	5.0	SP	0.0	ND	ND	NA	ND	ND
M031-C	08/10/94	0.0	SP	None	NA	ND	NA	ND	ND
M031-C	08/10/94	2.5	SP	None	ND	ND	NA	ND	ND
M031-C	08/10/94	5.0	SP-SW	None	ND	ND	NA	ND	ND
M031-C DUP	08/10/94	2.5	SP	None	ND	ND	NA	ND	ND
M031-E	08/10/94	0.0	SP-SM	0.0	NA	ND	NA	ND	ND
M031-E	08/10/94	2.5	SP-SM	0.0	ND	ND	NA	TPHC AS DIESEL: 76000J(h)	ND
M031-E	08/10/94	5.0	SP-SM	0.0	ND	ND	NA	ND	ND
M032-A	08/11/94	0.0	SM	0.1	NA	ND	NA	TPHC AS MOTOR OIL: 79000J(h)	ND

SUMMARY OF SOIL ORGANIC CHEMICAL ANALYSES FROM SITE 1
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

WELL NO.	SAMPLE DATE	SAMPLE DEPTH (feet bgs)	USCS CLASSIFICATION **	FIELD SCREEN (ppmv) ***	VOLATILE ORGANIC COMPOUNDS (ug/kg)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/kg)	PESTICIDES, PCB'S AND DIOXINS (ug/kg)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/kg)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/kg)
M032-A	08/11/94	2.5	SM	0.1	ND	ND	NA	TPHC AS MOTOR OIL: 35000J(h)	ND
M032-A	08/11/94	5.0	SP	0.1	ND	ND	NA	ND	ND
M033-A	08/10/94	0.0	GW	0.0	NA	ND	NA	TPHC AS DIESEL: 16000J(h) TPHC AS MOTOR OIL: 63000J(f,h)	ND
M033-A	08/10/94	2.5	SC	0.0	ND	ND	NA	TPHC AS DIESEL: 11000J(a,h) TPHC AS MOTOR OIL: 29000J(a,f,h)	ND
M033-A	08/10/94	5.0	SW	0.0	ND	ND	NA	ND	ND
M034-A	08/10/94	0.0	SW	0.0	NA	ND	NA	TPHC AS DIESEL: 57000J(h) TPHC AS MOTOR OIL: 110000J(f,h)	TPHC AS GASOLINE: 1900J(a,h)
M034-A	08/10/94	2.5	CL	0.0	ND	ND	NA	TPHC AS DIESEL: 71000J(a,h) TPHC AS MOTOR OIL: 180000J(a,f,h)	ND
M034-A	08/10/94	5.0	SW	0.0	ND	2-METHYLNAPHTHALENE: 440 ACENAPHTHENE: 800 ANTHRACENE: 390J(g) FLUORENE: 400 NAPHTHALENE: 1300	NA	TPHC AS DIESEL: 75000J(a,h) TPHC AS JP5: 46000J(a,h) TPHC AS MOTOR OIL: 140000J(a,f)	ND
M035-A	08/10/94	0.0	GW	0.0	NA	PYRENE: 360	NA	TPHC AS DIESEL: 52000J(h) TPHC AS MOTOR OIL: 160000J(f,h)	ND

SUMMARY OF SOIL ORGANIC CHEMICAL ANALYSES FROM SITE 1
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

WELL NO.	SAMPLE DATE	SAMPLE DEPTH (feet bgs)	USCS CLASSIFICATION	FIELD SCREEN (ppm/v)	VOLATILE ORGANIC COMPOUNDS (ug/kg)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/kg)	PESTICIDES, PCB'S AND DIOXINS (ug/kg)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/kg)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/kg)
M035-A	08/10/94	2.5	SW	0.0	ND	BENZO(A)ANTHRACENE: 7700 BENZO(A)PYRENE: 12000 BENZO(B)FLUORANTHENE: 15000 BENZO(G,H,I)PERYLENE: 5700 BENZO(K)FLUORANTHENE: 4900 CHRYSENE: 8700 FLUORANTHENE: 10000 INDENO(1,2,3-CD)PYRENE: 7500 PHENANTHRENE: 4900 PYRENE: 12000	NA	TPHC AS DIESEL: 110000J(h) TPHC AS MOTOR OIL: 300000J(f,h)	ND
M035-A	08/10/94	5.0	SC	0.0	ND	BENZO(G,H,I)PERYLENE: 420J(a)	NA	TPHC AS DIESEL: 2200000J(h) TPHC AS JP5: 2100000 TPHC AS MOTOR OIL: 65000J(f,h)	ND
M030-E DUP	08/15/94	4.5	SM	0.0	ND	ND	NA	ND	ND
SS1-AA-01	07/12/94	0.0	--	--	NA	ND	ND	TPHC AS MOTOR OIL: 110000J(h)	ND
SS1-AA-01 DUP	07/12/94	0.0	--	--	NA	ND	ND	TPHC AS MOTOR OIL: 170000J(h)	ND
SS1-AA-02	07/12/94	0.0	--	--	NA	ND	4,4'-DDT: 17J(g,h)	TPHC AS MOTOR OIL: 490000J(h)	ND
SS1-AA-03	07/12/94	0.0	--	--	NA	ND	ND	TPHC AS MOTOR OIL: 1200000J(h)	ND
SS1-BA-01	07/16/94	0.0	--	--	NA	NA	ND	TPHC AS MOTOR OIL: 220000J(h)	ND
SS1-BA-02	07/16/94	0.0	--	--	NA	NA	ND	TPHC AS MOTOR OIL: 270000J(a,h)	ND

SUMMARY OF SOIL ORGANIC CHEMICAL ANALYSES FROM SITE 1
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

WELL NO.	SAMPLE DATE	SAMPLE DEPTH (feet bgs)	USCS CLASSIFICATION **	FIELD SCREEN (ppm/v) ***	VOLATILE ORGANIC COMPOUNDS (ug/kg)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/kg)	PESTICIDES, PCB'S AND DIOXINS (ug/kg)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/kg)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/kg)
SS1-BA-03	07/16/94	00	-	-	NA	NA	ND	TPHC AS MOTOR OIL: 280000J(f,h)	ND
SS1-BA-04	07/16/94	00	-	-	NA	NA	ND	TPHC AS MOTOR OIL: 480000J(h)	ND
SS1-BA-05	07/16/94	00	-	-	NA	NA	AROCOR-1260: 720	TPHC AS MOTOR OIL: 680000J(f,h)	ND
SS1-BA-05 DUP	07/16/94	00	-	-	NA	NA	AROCOR-1260: 1000	TPHC AS MOTOR OIL: 700000J(f,h)	ND
SS1-RA-01	07/16/94	00	-	-	NA	ND	AROCOR-1254: 2000J(a)	TPHC AS MOTOR OIL: 200000J(h)	ND
SS1-RA-02	07/16/94	00	-	-	NA	ND	AROCOR-1260: 440J(a)	TPHC AS MOTOR OIL: 2600000J(f,h)	ND
SS1-RA-03	07/16/94	00	-	-	NA	ND	AROCOR-1260: 1000	TPHC AS MOTOR OIL: 2650000J(h)	ND
SS1-RA-04	07/16/94	00	-	-	NA	BENZO(A)ANTHRACENE: 2900 BENZO(A)PYRENE: 4700 BENZO(B)FLUORANTHENE: 4800 BENZO(G,H,I)PERYLENE: 2300 BENZO(K)FLUORANTHENE: 2600 CHRYSENE: 2700 FLUORANTHENE: 2300 INDENO(1,2,3-CD)PYRENE: 2300 PYRENE: 2700	ND	TPHC AS MOTOR OIL: 560000J(h)	ND
SS1-RA-04	07/16/94	00	-	-	NA	BENZO(A)ANTHRACENE: 4000 BENZO(A)PYRENE: 7100 BENZO(B)FLUORANTHENE: 7200 BENZO(G,H,I)PERYLENE: 3300 BENZO(K)FLUORANTHENE: 4400 CHRYSENE: 4300 FLUORANTHENE: 3600	ND	TPHC AS MOTOR OIL: 580000J(h)	ND

SUMMARY OF SOIL ORGANIC CHEMICAL ANALYSES FROM SITE 1
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

WELL NO.	SAMPLE DATE	SAMPLE DEPTH (feet bgs)	USCS CLASSIFICATION **	FIELD SCREEN (ppmv) ***	VOLATILE ORGANIC COMPOUNDS (ug/kg)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/kg)	PESTICIDES, PCB'S AND DIOXINS (ug/kg)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/kg)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/kg)
SS1-RA-04	07/16/94	0.0				INDENO(1,2,3-CD)PYRENE: 3700 PYRENE: 4000			
SS1-RA-05	07/16/94	0.0	-	-	NA	ND	ND	TPHC AS MOTOR OIL: 710000J(h)	ND
SS1-RA-06	07/16/94	0.0	-	-	NA	BENZO(A)PYRENE: 790 BENZO(B)FLUORANTHENE: 780	ND	TPHC AS MOTOR OIL: 520000J(h)	ND
SS1-RA-07	07/16/94	0.0	-	-	NA	ND	ND	TPHC AS MOTOR OIL: 110000J(h)	ND
SS1-RA-08	07/12/94	0.0	-	-	NA	ACENAPHTHENE: 670 ACENAPHTHYLENE: 720 ANTHRACENE: 1200 BENZO(A)ANTHRACENE: 1800 BENZO(A)PYRENE: 12000 CARBAZOLE: 1900 CHRYSENE: 2200 DIBENZ(A,H)ANTHRACENE: 1300 FLUORENE: 600 INDENO(1,2,3-CD)PYRENE: 1000 PHENANTHRENE: 15000 PYRENE: 29000	4,4'-DDT: 440J(a) ALPHA-CHLORDANE: 140J(a,h) GAMMA-CHLORDANE: 140J(a)	TPHC AS MOTOR OIL: 560000J(h)	ND
SS1-RA-09	07/12/94	0.0	-	-	NA	ACENAPHTHENE: 450 BENZO(A)ANTHRACENE: 1600 BENZO(A)PYRENE: 3300 BENZO(B)FLUORANTHENE: 3300 BENZO(G,H,I)PERYLENE: 1800 BENZO(K)FLUORANTHENE: 820 CHRYSENE: 1700 DIBENZ(A,H)ANTHRACENE: 600 FLUORANTHENE: 1100 INDENO(1,2,3-CD)PYRENE: 2400 PHENANTHRENE: 410 PYRENE: 1800	4,4'-DDT: 19J(h)	TPHC AS MOTOR OIL: 140000J(h)	ND

SUMMARY OF SOIL ORGANIC CHEMICAL ANALYSES FROM SITE 1
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

WELL NO.	SAMPLE DATE	SAMPLE DEPTH (feet bgs)	USCS CLASSIFICATION **	FIELD SCREEN (ppm/v) ***	VOLATILE ORGANIC COMPOUNDS (ug/kg)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/kg)	PESTICIDES, PCB'S AND DIOXINS (ug/kg)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/kg)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/kg)
SS1-RA-10	07/12/94	0.0	-	-	NA	ND	ND	TPHC AS MOTOR OIL: 130000J(h)	ND
SS1-RA-11	07/12/94	0.0	-	-	NA	ND	4,4'-DDT: 44	TPHC AS MOTOR OIL: 330000J(h)	ND
SS1-RA-12	07/12/94	0.0	-	-	NA	ND	ND	TPHC AS MOTOR OIL: 38000J(h)	ND
SS1-RA-12	07/12/94	0.0	-	-	NA	ND	ND	ND	ND
SS1-RA-13	07/12/94	0.0	-	-	NA	ND	ND	TPHC AS MOTOR OIL: 33000J(h)	ND
SS1-RA-14	07/12/94	0.0	-	-	NA	ND	ND	ND	ND
SS1-RA-15	07/12/94	0.0	-	-	NA	ND	ND	TPHC AS MOTOR OIL: 110000J(h)	ND
SS1-RA-16	07/12/94	0.0	-	-	NA	ND	ND	TPHC AS MOTOR OIL: 48000J(h)	ND
SS1-RA-17	07/12/94	0.0	-	-	NA	ND	ND	TPHC AS MOTOR OIL: 23000J(h)	ND
SS1-RA-18	07/12/94	0.0	-	-	NA	BENZO(A)ANTHRACENE: 350J(g)	ND	TPHC AS MOTOR OIL: 330000J(h)	ND
SS1-RA-19	07/12/94	0.0	-	-	NA	ND	ND	ND	ND
SS1-RA-20	07/12/94	20	-	-	NA	ND	ND	TPHC AS MOTOR OIL: 41000J(h)	ND

SUMMARY OF SOIL ORGANIC CHEMICAL ANALYSES FROM SITE 1
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

WELL NO.	SAMPLE DATE	SAMPLE DEPTH (feet bgs)	USCS CLASSIFICATION **	FIELD SCREEN (ppm/v) ***	VOLATILE ORGANIC COMPOUNDS (ug/kg)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/kg)	PESTICIDES, PCB'S AND DIOXINS (ug/kg)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/kg)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/kg)
SS1-RA-21	07/12/94	21.	-	-	NA	ND	ND	TPHC AS MOTOR OIL: 220000J(h)	ND

* Sample depth indicated represents the top of an 18-inch sample interval.

** USCS Interpretation (for soil borings only):

GW = well-graded gravel	SW = well-graded sand	ML = inorganic silt and very fine sands	MH = inorganic silts, micaceous or diatomaceous fine sand or silty soils
GP = poorly-graded gravel	SP = poorly-graded sand	CL = inorganic clay, low-med plasticity	CH = inorganic clay, high plasticity
GM = silty gravel	SM = silty sand	OL = organic silts and organic silty clays	OH = organic silt/clay, med - high plasticity
GC = clayey gravel	SC = clayey sand		PT = peat

*** Field screening results were obtained using a photoionization detector calibrated using a 100 ppm/v isobutylene standard gas (for soil borings only).

Analytical Data Comments: ug/kg = Micrograms per kilogram

ND = Analytes reported below detection limits

ug/L = Micrograms per liter

NA = Not Analyzed

J = Value estimated at reported concentration

ppm/v = Parts per million volume

PCBs = Polychlorinated Biphenyls

Analytical QA/QC Comments:

- (a) - Surrogate recovery problem
- (b) - Blank contamination problems
- (c) - Matrix spike recovery problems
- (d) - Duplicate (precision) problems

- (e) - Internal standards problems
- (f) - Calibration problems
- (g) - Quantification below reporting limit
- (h) - Other problems, refer to data validation narrative

"-" = Not Applicable

TABLE 5-3

**METAL RESULTS IN SOIL EXCEEDING TEN TIMES THE STLC
FROM SITE 1
CTO 280
ALAMEDA NAVAL AIR STATION**

Sample Location and Depth	Sample Date	Metal	Detected Concentration (mg/kg)	STLC x 10 (mg/kg) ^(a)
M003-B-.5	08/15/94	BARIUM	1120	1000.00
M003-B-2.5	08/15/94	LEAD	58.3	50.00
M003-E-2	08/15/94	BARIUM	1130	1000.00
M028-C-0	08/11/94	LEAD	53.1	50.00
M028-C-2.5	08/11/94	CADMIUM	11.0	10.00
	08/11/94	LEAD	179	50.00
M028-C-5.0	08/11/94	BERYLLIUM	8.6	7.50
	08/11/94	CADMIUM	62.6	10.00
	08/11/94	COPPER	969	250.00
	08/11/94	LEAD	1520	50.00
M030-A-2	08/15/94	LEAD	74.8	50.00
M030-C-.5	08/15/94	LEAD	135	50.00
M034-A-0	08/10/94	LEAD	108 J	50.00
M035-A-2.5	08/10/94	LEAD	154 J	50.00
SS1-AA-1	07/12/94	LEAD	338	50.00
SS1-AA-1DUP	07/12/94	LEAD	430	50.00
SS1-AA-2	07/12/94	LEAD	202	50.00
SS1-BA-1	07/16/94	LEAD	134 J	50.00
SS1-BA-2	07/16/94	LEAD	102 J	50.00
SS1-BA-3	07/16/94	LEAD	71.2 J	50.00
SS1-BA-4	07/16/94	BARIUM	1090	1000.00
SS1-BA-5	07/16/94	LEAD	111 J	50.00
SS1-BA-5DUP	07/16/94	LEAD	72.3 J	50.00

Note: ^(a) For the purpose of a screening criteria for this document, soil concentrations have been compared to a value equal to 10 times the STLC.

J - Estimated Concentration

STLC - Solubility Threshold Limit Concentration

TABLE 5-3
METAL RESULTS IN SOIL EXCEEDING TEN TIMES THE STLC
FROM SITE 1
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

Sample Location and Depth	Sample Date	Metal	Detected Concentration (mg/kg)	STLC x 10 (mg/kg) ^(a)
SS1-RA-1	07/16/94	LEAD	158 J	50.00
SS1-RA-10	07/12/94	LEAD	50.4	50.00
SS1-RA-11	07/12/94	LEAD	50.9	50.00
SS1-RA-14	07/12/94	LEAD	752	50.00
SS1-RA-2	07/16/94	LEAD	205 J	50.00
SS1-RA-3	07/16/94	LEAD	94.3 J	50.00
SS1-RA-4	07/16/94	LEAD	55.3 J	50.00
SS1-RA-4DUP	07/16/94	LEAD	51.5 J	50.00
SS1-RA-5	07/16/94	LEAD	91.9 J	50.00
SS1-RA-6	07/16/94	LEAD	223 J	50.00
SS1-RA-7	07/16/94	LEAD	52.1 J	50.00
SS1-RA-8	07/12/94	CADMIUM	12.0 J	10.00
	07/12/94	LEAD	643	50.00
SS1-RA-9	07/12/94	LEAD	83.5	50.00

Note: ^(a) For the purpose of a screening criteria for this document, soil concentrations have been compared to a value equal to 10 times the STLC.

J - Estimated Concentration

STLC - Solubility Threshold Limit Concentration

SUMMARY OF GROUNDWATER ORGANIC CHEMICAL ANALYSES AND TDS FROM SITE 1
CTO 280
ALAMEDA NAVAL AIR STATION

WELL NO.	WATER BEARING ZONE	SAMPLE DATE	VOLATILE ORGANIC COMPOUNDS (ug/L)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/L)	PESTICIDES, PCB'S AND DIOXINS (ug/L)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/L)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/L)	TOTAL DISSOLVED SOLIDS (mg/L)
M001-A	1	10/04/94	ND	ND	NA	NA	NA	1290
M001-A DUP	1	10/04/94	ND	ND	NA	NA	NA	1410
M001-B	2	10/05/94	CARBON DISULFIDE 3	ND	NA	NA	NA	17400
M001-E	1	10/04/94	CHLOROBENZENE 2 ETHYLBENZENE 1 XYLENE (TOTAL) 6	NAPHTHALENE 110	NA	NA	NA	1650
M002-A	1	12/07/94	1,2-DICHLOROETHENE (TOTAL) 52 TRICHLOROETHENE 71	ND	NA	NA	NA	2200
M002-E	1	10/04/94	ND	ND	NA	NA	NA	15200
M003-A	1	10/04/94	ND	ND	NA	NA	NA	362
M003-B	2	11/28/94	ND	PHENOL 12	NA	NA	NA	19000
M003-E	1	10/04/94	ND	ND	NA	NA	NA	591
M004-A	1	10/05/94	ND	ND	NA	NA	NA	1610
M005-A	1	10/05/94	1,2-DICHLOROETHENE (TOTAL) 23(h) VINYL CHLORIDE 1	ND	NA	NA	NA	722
M006-A	1	10/05/94	ND	ND	NA	NA	NA	186
M007-A	1	10/06/94	1,2-DICHLOROETHENE (TOTAL) 1	ND	NA	NA	NA	456
M007-A DUP	1	10/06/94	1,2-DICHLOROETHENE (TOTAL) 1	ND	NA	NA	NA	320
M007-C	2	10/05/94	CARBON DISULFIDE 3	BIS(2-ETHYLHEXYL)PHTHALATE 98	NA	NA	NA	13600
M025-A	1	10/06/94	ND	ND	NA	NA	NA	22500
M025-C	2	10/06/94	ND	ND	NA	NA	NA	4210

SUMMARY OF GROUNDWATER ORGANIC CHEMICAL ANALYSES AND TDS FROM SITE 1

CTO 280
ALAMEDA NAVAL AIR STATION

(Continued)

WELL NO.	WATER BEARING ZONE	SAMPLE DATE	VOLATILE ORGANIC COMPOUNDS (ug/L)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/L)	PESTICIDES, PCB'S AND DIOXINS (ug/L)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/L)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/L)	TOTAL DISSOLVED SOLIDS (mg/L)
M025-E	1	10/06/94	ND	ND	NA	NA	NA	684
M026-A	1	10/06/94	ND	BIS(2-ETHYLHEXYL)PHTHALATE 87	NA	NA	NA	26700
M026-E	1	10/07/94	1,1,1-TRICHLOROETHANE: 1	ND	NA	NA	NA	9770
M027-A	1	10/07/94	1,2-DICHLOROETHENE (TOTAL): 6	ND	NA	NA	NA	1700
M027-C	2	11/30/94	ND	ND	NA	NA	NA	16000
M027-E	1	10/07/94	1,2-DICHLOROETHENE (TOTAL): 6	ND	NA	NA	NA	2480
M028-A	1	10/10/94	1,1-DICHLOROETHANE: 2 1,2-DICHLOROETHENE (TOTAL): 3100 BENZENE: 3 CHLOROBENZENE: 4 ETHYLBENZENE: 2 TOLUENE: 1700 VINYL CHLORIDE: 4200 XYLENE (TOTAL): 11	2,4-DIMETHYLPHENOL: 13000	NA	NA	NA	1160
M028-A DUP	1	10/10/94	1,1-DICHLOROETHANE: 61 1,2-DICHLOROETHENE (TOTAL): 4700 BENZENE: 120 CHLOROBENZENE: 130 ETHYLBENZENE: 100 TOLUENE: 2200 VINYL CHLORIDE: 11000 XYLENE (TOTAL): 510	2,4-DIMETHYLPHENOL: 6200	NA	NA	NA	1120
M028-C	2	12/01/94	BROMODICHLOROMETHANE: 2 CHLOROFORM: 34	ND	NA	NA	NA	2700
M028-E	1	11/28/94	1,1-DICHLOROETHANE: 5 1,2-DICHLOROETHENE (TOTAL): 16 BENZENE: 16J(f) CHLOROBENZENE: 24 ETHYLBENZENE: 16 TOLUENE: 12J(f) VINYL CHLORIDE: 22 XYLENE (TOTAL): 43	2,4-DIMETHYLPHENOL: 22 PHENOL: 15	NA	NA	NA	590

SUMMARY OF GROUNDWATER ORGANIC CHEMICAL ANALYSES AND TDS FROM SITE 1
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

WELL NO.	WATER BEARING ZONE	SAMPLE DATE	VOLATILE ORGANIC COMPOUNDS (ug/L)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/L)	PESTICIDES, PCB'S AND DIOXINS (ug/L)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/L)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/L)	TOTAL DISSOLVED SOLIDS (mg/L)
M029-A	1	10/10/94	BENZENE 5 TOLUENE 4	ND	NA	NA	NA	648
M029-E	1	10/10/94	1,2-DICHLOROETHENE (TOTAL) 1 BENZENE 3 XYLENE (TOTAL) 1	ND	NA	NA	NA	1060
M030-A	1	10/10/94	ND	ND	NA	NA	NA	516
M030-C	2	12/05/94	CHLOROFORM 2	ND	NA	NA	NA	24000
M030-E	1	10/10/94	ND	ND	NA	NA	NA	1130
M031-A	1	10/10/94	ND	ND	NA	NA	NA	862
M031-C	2	12/05/94	CHLOROFORM 1	ND	NA	NA	NA	23000
M031-E	1	10/10/94	ND	ND	NA	NA	NA	886
M032-A	1	10/11/94	1,2-DICHLOROETHENE (TOTAL) 2 VINYL CHLORIDE 3	ND	NA	NA	NA	690
M033-A	1	11/29/94	1,2-DICHLOROETHENE (TOTAL) 24	ND	NA	NA	NA	730
M034-A	1	10/11/94	1,1-DICHLOROETHANE 12 1,2-DICHLOROETHENE (TOTAL) 200 BENZENE 100 CHLOROBENZENE 62 ETHYLBENZENE 44 TOLUENE 840 VINYL CHLORIDE 1400 XYLENE (TOTAL) 220	2,4-DIMETHYLPHENOL 240 NAPHTHALENE 280	NA	NA	NA	1080
M035-A	1	10/11/94	1,2-DICHLOROETHENE (TOTAL) 15 CHLOROFORM 7 TOLUENE 1 TRICHLOROETHENE 7	ND	NA	NA	NA	522
M035-A DUP	1	10/11/94	1,2-DICHLOROETHENE (TOTAL) 15 CHLOROFORM 7	ND	NA	NA	NA	454

SUMMARY OF GROUNDWATER ORGANIC CHEMICAL ANALYSES AND TDS FROM SITE 1
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

WELL NO.	WATER BEARING ZONE	SAMPLE DATE	VOLATILE ORGANIC COMPOUNDS (ug/L)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/L)	PESTICIDES, PCB'S AND DIOXINS (ug/L)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/L)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/L)	TOTAL DISSOLVED SOLIDS (mg/L)
M035-A DUP			TOLUENE 1 TRICHLOROETHENE 8					
HP1-10-A	1	08/09/94	1,2-DICHLOROETHENE (TOTAL) 1	NA	NA	NA	NA	405
HP1-10-D	1	08/09/94	CARBON DISULFIDE 2	ND	NA	NA	NA	3430
HP1-10-E	1	08/10/94	CARBON DISULFIDE 0.6J(f,g)	ND	NA	NA	NA	6110
HP1-11-A	1	08/09/94	ND	ND	NA	NA	NA	762
HP1-11-D	1	08/09/94	ND	ND	NA	NA	NA	12600
HP1-11-E	1	08/09/94	ND	ND	NA	NA	NA	14000
HP1-2-A	1	08/08/94	CARBON DISULFIDE 4	ND	NA	NA	NA	ND
HP1-2-A DUP	1	08/08/94	ND	BIS(2-ETHYLHEXYL)PHTHALATE 4.0J(b)	NA	NA	NA	25200 J(h)
HP1-2-D	1	08/08/94	ND	ND	NA	NA	NA	28100 J(h)
HP1-2-E	1	08/08/94	CARBON DISULFIDE 2	ND	NA	NA	NA	4520
HP1-5-A	1	08/08/94	ND	ND	NA	NA	NA	1240 J(h)
HP1-5-D	1	08/02/94	ND	ND	NA	NA	NA	21600
HP1-5-E	1	08/09/94	CARBON DISULFIDE 3	ND	NA	NA	NA	5130
HP1-8-A	1	08/15/94	CARBON DISULFIDE 1	ND	NA	NA	NA	188
HP1-8-D	1	08/15/94	CARBON DISULFIDE 8	ND	NA	NA	NA	8730
HP1-8-E	1	08/15/94	ND	ND	NA	NA	NA	1140
HP1-8-E DUP	1	08/15/94	ND	ND	NA	NA	NA	1190

Analytical QA Comments:

ug/kg = Micrograms per kilogram

ug/L = Micrograms per liter

J = Value estimated at reported concentration

SHP = "Shallow" HydroPunch obtained from first water-bearing zone.

DHP = "Deep" HydroPunch obtained from second water-bearing zone.

ND = Analytes reported below detection limits

NA = Not Analyzed

ppm/v = Parts per million volume

PCBs = Polychlorinated Biphenyls

Analytical QA/QC Comments:

(a) - Surrogate recovery problem

(b) - Blank contamination problems

(c) - Matrix spike recovery problems

(d) - Duplicate (precision) problems

(e) - Internal standards problems

(f) - Calibration problems

(g) - Quantification below reporting limit

(h) - Other problems, refer to data validation narrative

TABLE 5-5

**METAL RESULTS IN GROUNDWATER EXCEEDING 95 PERCENT/95 PERCENT STI
FROM SITE 1
CTO 280
ALAMEDA NAVAL AIR STATION**

Sample Location	Sample Date	Metal	Detected Concentration (ug/L)	Upper Tolerance Limit (ug/L) ^(a)
M001-A	10/04/94	NICKEL	9.8 J	6.6
M001-E	10/04/94	NICKEL	14.8 J	6.6
M002-A	12/07/94	BERYLLIUM	1.5 J	1.3
M004-A	10/05/94	BERYLLIUM	2.3 J	1.3
M005-A	10/05/94	BERYLLIUM	1.7 J	1.3
M006-A	10/05/94	BERYLLIUM	2.2 J	1.3
	10/05/94	NICKEL	9.8 J	6.6
M007-A	10/06/94	BERYLLIUM	2.3 J	1.3
M007-A Dup	10/06/94	NICKEL	11.4 J	6.6
M025-E	10/06/94	SILVER	35.0 R	2.4
M026-A	10/06/94	SILVER	2.8 R	2.4
M028-A	10/10/94	CHROMIUM	4.2 J	3.2
M028-E	11/28/94	BERYLLIUM	1.5 J	1.3
M029-E	10/10/94	LEAD	1.8 J	1
M030-E	10/10/94	LEAD	2.3 J	1
M033-A	11/29/94	SELENIUM	3.8 J	1.0

Note: ^(a) This value represents the upper tolerance interval of the 95 percent/95 percent STI (95/95 STI). The 95/95 STI is the value below which 95 percent of the groundwater samples are expected to fall 95 percent of the time, based on previous groundwater samples collected from NAS Alameda from areas of non-industrial use.

J - Estimated concentration

STI - Statistical Tolerance Interval

SUMMARY OF QUALITY CONTROL ORGANIC CHEMICAL ANALYSES FROM SITE 1
CTO 280
ALAMEDA NAVAL AIR STATION

WELL NO.	SAMPLE DATE	VOLATILE ORGANIC COMPOUNDS (ug/L)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/L)	PESTICIDES, PCB'S AND DIOXINS (ug/L)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/L)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/L)
S01-ER-01	07/12/94	NA	ND	ND	TPHC AS DIESEL: 120J(h)	ND
S01-ER-02	07/16/94	NA	ND	ND	ND	ND
S01-ER-03	08/08/94	ND	ND	NA	NA	NA
S01-ER-04	08/09/94	ND	ND	NA	NA	NA
S01-ER-05	08/10/94	ND	ND	NA	ND	ND
S01-ER-06	08/15/94	ND	ND	NA	NA	NA
S01-ER-07	08/15/94	CARBON DISULFIDE 6	ND	NA	TPHC AS MOTOR OIL: 740J(h)	ND
S01-TB	08/15/94	ND	NA	NA	NA	NA
S01-TB-01	08/02/94	ND	NA	NA	NA	NA
S01-TB-02	08/08/94	ND	NA	NA	NA	NA
S01-TB-03	08/09/94	1,2-DICHLOROETHANE 0.5J(f)	NA	NA	NA	NA
S01-TB-04	10/04/94	1,1,1-TRICHLOROETHANE 9 1,1-DICHLOROETHANE 5 1,1-DICHLOROETHENE 1 TRICHLOROETHENE 5 XYLENE (TOTAL) 1	NA	NA	NA	NA
S01-TB-05	08/10/94	ND	NA	NA	NA	NA
S01-TB-06	08/15/94	1,2-DICHLOROETHANE 1	NA	NA	NA	NA
S01-TB-07	10/05/94	1,2-DICHLOROETHANE 2	NA	NA	NA	NA
S01-TB-08	10/06/94	1,2-DICHLOROETHANE 2	NA	NA	NA	NA

SUMMARY OF QUALITY CONTROL ORGANIC CHEMICAL ANALYSES FROM SITE 1
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

WELL NO.	SAMPLE DATE	VOLATILE ORGANIC COMPOUNDS (ug/L)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/L)	PESTICIDES, PCB'S AND DIOXINS (ug/L)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/L)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/L)
S01-TB-09	10/07/94	1,2-DICHLOROETHANE 2	NA	NA	NA	NA
S01-TB-10	10/10/94	1,2-DICHLOROETHANE 1	NA	NA	NA	NA
TB	10/11/94	1,2-DICHLOROETHANE 1	NA	NA	NA	NA
TB	10/05/94	1,2-DICHLOROETHANE 2	NA	NA	NA	NA
TB	10/06/94	1,2-DICHLOROETHANE 2 CHLOROMETHANE 2J(f)	NA	NA	NA	NA

Analytical Data Comments: ug/kg = Micrograms per kilogram

ug/L = Micrograms per liter

J = Value estimated at reported concentration

TB = Trip Blank

ER = Equipment Rinsate

ND = Analytes reported below detection limits

NA = Not Analyzed

ppm/v = Parts per million volume

PCBs = Polychlorinated Biphenyls

Analytical QA/QC Comments: (a) - Surrogate recovery problem
 (b) - Blank contamination problems
 (c) - Matrix spike recovery problems
 (d) - Duplicate (precision) problems

(e) - Internal standards problems
 (f) - Calibration problems
 (g) - Quantification below reporting limit
 (h) - Other problems, refer to data validation narrative

TABLE 6-1
SUMMARY OF FIELD WORK FOR SITE 2
CTO 280
ALAMEDA NAVAL AIR STATION

Cone Penetrometer Testing	Shallow HydroPunch	Deep HydroPunch	Surface Soil Sampling	Shallow Wells	Deep Wells	Groundwater Sampling
CPT-S02-01	HP2-1-A	HP2-1-D	SS2-1	M016-E	M016-E	M010-B ^a
CPT-S02-02	HP2-1-E	HP2-2-D	SS2-2		M023-C	M011-A
CPT-S02-03	HP2-2-A	HP2-4-D	SS2-3			M012-B
CPT-S02-04	HP2-2-E	HP2-5-D	SS2-4			M013-C ^a
CPT-S02-05	HP2-4-A		SS2-5			M016-E
CPT-S02-06	HP2-4-E		SS2-6			M016-B
CPT-S02-07	HP2-5-A		SS2-7			M020-B ^a
	HP2-5-E					M021-A
						M021-E
						M021-C ^a
						M022-A
						M022-E
						M023-A
						M023-E
						M023-C
						M023-B ^a
						M024-A
						M024-E

^a Monitoring wells will be sampled during Quarter 1 and Quarter 3 only.

SUMMARY OF SOIL ORGANIC CHEMICAL ANALYSES FROM SITE 2
CTO 280
ALAMEDA NAVAL AIR STATION

WELL NO.	SAMPLE DATE	SAMPLE DEPTH (feet bgs)	USCS CLASSIFICATION	FIELD SCREEN (ppmv)	VOLATILE ORGANIC COMPOUNDS (ug/kg)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/kg)	PESTICIDES, PCB'S AND DIOXINS (ug/kg)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/kg)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/kg)
M016-B	08/15/94	0.5	SP		ND	ND	NA	TPHC AS MOTOR OIL 160000J(h)	ND
M016-B	08/15/94	2.0	SP		ND	ND	NA	ND	ND
M016-B	08/15/94	8.0	SP		ND	ND	NA	TPHC AS MOTOR OIL 38000J(h)	ND
M016-E	08/15/94	0.5	SP		ND	ND	NA	TPHC AS MOTOR OIL 88000J(h)	ND
M016-E	08/15/94	2.0	SP		ND	ND	NA	ND	ND
M016-E	08/15/94	8.0	SP		ND	ND	NA	TPHC AS MOTOR OIL 25000J(h)	ND
M023-C	08/22/94	0.0	GW		NA	ND	NA	TPHC AS MOTOR OIL 2680000J(f,h)	ND
M023-C	08/22/94	3.0	GW		ND	ND	NA	TPHC AS MOTOR OIL 5290000J(f,h)	TPHC AS UNLEADED GASOLINE 870J(h)
M023-C	08/22/94	5.0	GW		CHLOROBENZENE 180	ND	NA	TPHC AS MOTOR OIL 1450000J(f,h)	ND
SS2-1	08/22/94	0.0	--	--	NA	NA	NA	ND	ND
SS2-2	07/12/94	0.0	--	--	NA	NA	NA	TPHC AS MOTOR OIL 48000J(h)	ND
SS2-3	07/12/94	0.0	--	--	NA	NA	NA	TPHC AS MOTOR OIL 76000J(h)	ND

SUMMARY OF SOIL ORGANIC CHEMICAL ANALYSES FROM SITE 2
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

WELL NO.	SAMPLE DATE	SAMPLE DEPTH (feet bgs)	USCS CLASSIFICATION **	FIELD SCREEN (ppmv) ***	VOLATILE ORGANIC COMPOUNDS (ug/kg)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/kg)	PESTICIDES, PCB'S AND DIOXINS (ug/kg)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/kg)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/kg)
SS2-4	08/22/94	00	--	--	NA	NA	NA	TPHC AS MOTOR OIL: 34000J(h)	ND
SS2-4 DUP	08/22/94	00	--	--	NA	NA	NA	TPHC AS MOTOR OIL: 26000J(h)	ND
SS2-5	08/22/94	00	--	--	NA	NA	NA	TPHC AS MOTOR OIL: 31000J(h)	ND
SS2-6	07/12/94	00	--	--	NA	NA	NA	ND	ND
SS2-7	07/12/94	00	--	--	NA	NA	NA	TPHC AS MOTOR OIL: 87000J(h)	ND

* Sample depth: " indicates the top of an 18-inch sample interval.

** USCS Interpretation (for soil borings only):

GW = well-graded gravel	SW = well-graded sand	ML = inorganic silt and very fine sands	MH = inorganic silts, micaceous or diatomaceous fine sand or silty soils
GP = poorly-graded gravel	SP = poorly-graded sand	CL = inorganic clay, low-med plasticity	CH = inorganic clay, high plasticity
GM = silty gravel	SM = silty sand	OL = organic silts and organic silty clays	OH = organic silt/clay, med - high plasticity
GC = clayey gravel	SC = clayey sand		PT = peat

*** Field screening results were obtained using a photoionization detector calibrated using a 100 ppm/v isobutylene standard gas (for soil borings only).

Analytical Data Comments: ug/kg = Micrograms per kilogram

ND = Analytes reported below detection limits

ug/L = Micrograms per liter

NA = Not Analyzed

J = Value estimated at reported concentration

ppm/v = Parts per million volume

PCBs = Polychlorinated Biphenyls

Analytical QA/QC Comments:

(a) - Surrogate recovery problem

(e) - Internal standards problems

(b) - Blank contamination problems

(f) - Calibration problems

(c) - Matrix spike recovery problems

(g) - Quantification below reporting limit

(d) - Duplicate (precision) problems

(h) - Other problems, refer to data validation narrative

"--" = Not Applicable

TABLE 6-3

**METAL RESULTS IN SOIL EXCEEDING TEN TIMES THE STLC
FROM SITE 2
CTO 280
ALAMEDA NAVAL AIR STATION**

Sample Location and Depth	Sample Date	Metal	Detected Concentration (mg/kg)	STLC x 10 (mg/kg) ^(a)
M016-E-2	08/15/94	LEAD	170	50.00
M023-C-0	08/22/94	CADMIUM	12.3	10.00

Note: ^(a) For the purpose of a screening criteria for this document, soil concentrations have been compared to a value equal to 10 times the STLC.

J - Estimated Concentration

STLC - Solubility Threshold Limit Concentration

SUMMARY OF GROUNDWATER ORGANIC CHEMICAL ANALYSES AND TDS FROM SITE 2
CTO 280
ALAMEDA NAVAL AIR STATION

WELL NO.	WATER BEARING ZONE	SAMPLE DATE	VOLATILE ORGANIC COMPOUNDS (ug/L)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/L)	PESTICIDES, PCB'S AND DIOXINS (ug/L)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/L)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/L)	TOTAL DISSOLVED SOLIDS (mg/L)
M010-B	2	10/06/94	ND	BIS(2-ETHYLHEXYL)PHTHALATE 67	ND	NA	NA	8550
M011-A	1	10/11/94	ND	ND	ND	NA	NA	5660
M012-B	2	10/06/94	ND	ND	ND	NA	NA	22000
M013-C	2	12/08/94	1,1,1-TRICHLOROETHANE 2 ACETONE 26J(f) CHLOROFORM 11 TOLUENE 5	ND	ND	NA	NA	1600
M014-B	2	10/06/94	ND	ND	ND	NA	NA	19600
M016-A	1	10/12/94	ND	ND	ND	NA	NA	23500
M016-B	2	12/07/94	CHLOROFORM 2 TOLUENE 2	ND	ND	NA	NA	24000
M016-E	1	10/12/94	ND	ND	ND	NA	NA	18900
M020-B	2	10/07/94	ND	ND	ND	NA	NA	7620
M021-A	1	10/11/94	ND	ND	ND	NA	NA	23600
M021-C	2	12/07/94	TOLUENE 2	ND	ND	NA	NA	2600
M021-E	1	10/11/94	ND	ND	ND	NA	NA	24500
M022-A	1	10/12/94	CHLOROETHANE 2J(f)	ND	ND	NA	NA	17800
M022-E	1	10/12/94	CARBON DISULFIDE 2J(f)	ND	ND	NA	NA	18200
M023-A	1	10/11/94	ND	ND	ND	NA	NA	28000
M023-A DUP	1	10/11/94	ND	ND	ND	NA	NA	28400
M023-B	2	10/10/94	ND	ND	ND	NA	NA	6470

SUMMARY OF GROUNDWATER ORGANIC CHEMICAL ANALYSES AND TDS FROM SITE 2
 CTO 280
 ALAMEDA NAVAL AIR STATION
 (Continued)

WELL NO.	WATER BEARING ZONE	SAMPLE DATE	VOLATILE ORGANIC COMPOUNDS (ug/L)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/L)	PESTICIDES, PCB'S AND DIOXINS (ug/L)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/L)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/L)	TOTAL DISSOLVED SOLIDS (mg/L)
M023-C	2	12/09/94	ND	ND	ND	NA	NA	26000
M023-E	1	10/11/94	1,2-DICHLOROETHENE (TOTAL) 3 ACETONE 27J(f) BENZENE 1 CHLOROBENZENE 1 TOLUENE 8 VINYL CHLORIDE 10 XYLENE (TOTAL) 3	2,4-DIMETHYLPHENOL 65	ND	NA	NA	18300
M024-A	1	10/12/94	BENZENE 21 CHLOROBENZENE 320	1,4-DICHLOROBENZENE 6 ACENAPHTHENE 21	ND	NA	NA	4070
M024-E	1	10/12/94	CHLOROBENZENE 110	ND	DELTA-BHC 0.050J(a)	NA	NA	3480
HP2-1-A	1	08/19/94	ND	ND	NA	NA	NA	16800 J(h)
HP2-1-D	1	08/18/94	CARBON DISULFIDE 9	ND	NA	NA	NA	28600 J(h)
HP2-1-D DUP	1	08/18/94	CARBON DISULFIDE 8	ND	NA	NA	NA	27300 J(h)
HP2-1-E	1	08/18/94	ND	ND	NA	NA	NA	30800 J(h)
HP2-2-A	1	08/12/94	ND	ND	NA	NA	NA	28400
HP2-2-D	1	08/12/94	ND	ND	NA	NA	NA	27100
HP2-2-E	1	08/11/94	ND	ND	NA	NA	NA	28500
HP2-4-A	1	08/10/94	2-BUTANONE 32J(f)	ND	NA	NA	NA	80
HP2-4-D	1	08/10/94	CARBON DISULFIDE 2J(f)	ND	NA	NA	NA	26600
HP2-4-E	1	08/10/94	2-BUTANONE 53J(f)	ND	NA	NA	NA	538
HP2-5-A	1	08/19/94	CARBON DISULFIDE 25	ND	NA	NA	NA	1450

SUMMARY OF GROUNDWATER ORGANIC CHEMICAL ANALYSES AND TDS FROM SITE 2

CTO 280
ALAMEDA NAVAL AIR STATION

(Continued)

WELL NO.	WATER BEARING ZONE	SAMPLE DATE	VOLATILE ORGANIC COMPOUNDS (ug/L)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/L)	PESTICIDES, PCB'S AND DIOXINS (ug/L)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/L)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/L)	TOTAL DISSOLVED SOLIDS (mg/L)
HP2-5-D	1	08/19/94	2-BUTANONE 57J(f) CARBON DISULFIDE 20	ND	NA	NA	NA	20700 J(h)
HP2-5-E	1	08/19/94	CARBON DISULFIDE 21	ND	NA	NA	NA	22800 J(h)
HP2-5-E DUP	1	08/19/94	CARBON DISULFIDE 22	ND	NA	NA	NA	25000 J(h)

Analytical Data Comments: ug/kg = Micrograms per kilogram

ug/L = Micrograms per liter

J = Value estimated at reported concentration

SHP = "Shallow" HydroPunch obtained from first water-bearing zone.

DHP = "Deep" HydroPunch obtained from second water-bearing zone.

ND = Analytes reported below detection limits

NA = Not Analyzed

ppm/v = Parts per million volume

PCBs = Polychlorinated Biphenyls

Analytical QA/QC Comments: (a) - Surrogate recovery problem

(b) - Blank contamination problems

(c) - Matrix spike recovery problems

(d) - Duplicate (precision) problems

(e) - Internal standards problems

(f) - Calibration problems

(g) - Quantification below reporting limit

(h) - Other problems, refer to data validation narrative

TABLE 6-5

**METAL RESULTS IN GROUNDWATER EXCEEDING 95 PERCENT/95 PERCENT STI
FROM SITE 2
CTO 280
ALAMEDA NAVAL AIR STATION**

Sample Location	Sample Date	Metal	Detected Concentration (ug/L)	Upper Tolerance Limit (ug/L) ^(a)
M022-E	10/11/94	CADMIUM	3.4 J	2.0
	10/11/94	COPPER	37.3	27.7
	10/11/94	LEAD	1.6 J	1

Note: ^(a) This value represents the upper tolerance interval of the 95 percent/95 percent STI (95/95 STI). The 95/95 STI is the value below which 95 percent of the groundwater samples are expected to fall 95 percent of the time, based on previous groundwater samples collected from NAS Alameda from areas of non-industrial use.

J - Estimated concentration

STI - Statistical Tolerance Interval

SUMMARY OF QUALITY CONTROL ORGANIC CHEMICAL ANALYSES FROM SITE 2
CTO 280
ALAMEDA NAVAL AIR STATION

WELL NO.	SAMPLE DATE	VOLATILE ORGANIC COMPOUNDS (ug/L)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/L)	PESTICIDES, PCB'S AND DIOXINS (ug/L)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/L)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/L)
S02-ER-03	08/22/94	NA	NA	NA	ND	ND
S02-ER-13	08/12/94	1,2-DICHLOROETHANE 0.7	ND	NA	NA	NA
S02-ER-14	08/19/94	ND	ND	NA	NA	NA
S02-TB-01	08/10/94	ND	NA	NA	NA	NA
S02-TB-02	08/12/94	ND	NA	NA	NA	NA
S02-TB-03	08/22/94	ND	NA	NA	NA	NA
S02-TB-04	08/22/94	ND	NA	NA	NA	NA
S02-TB-07	10/07/94	1,2-DICHLOROETHANE 3	NA	NA	NA	NA
S02-TB-08	10/10/94	ND	NA	NA	NA	NA
S02-TB-10	08/19/94	ND	NA	NA	NA	NA
S02-TB-14	10/12/94	ND	NA	NA	NA	NA
TB	10/13/94	1,2-DICHLOROETHANE 1	NA	NA	NA	NA

Analytical Data Comments: ug/kg = Micrograms per kilogram

ug/L = Micrograms per liter

J = Value estimated at reported concentration

TB = Trip Blank

ER = Equipment Rinsate

ND = Analytes reported below detection limits

NA = Not Analyzed

ppm/v = Parts per million volume

PCBs = Polychlorinated Biphenyls

Analytical QA/QC Comments:

- (a) - Surrogate recovery problem
- (b) - Blank contamination problems
- (c) - Matrix spike recovery problems
- (d) - Duplicate (precision) problems

- (e) - Internal standards problems
- (f) - Calibration problems
- (g) - Quantification below reporting limit
- (h) - Other problems, refer to data validation narrative

TABLE 7-1

**SUMMARY OF FIELD WORK FOR THE RUNWAY AREA
CTO 280
ALAMEDA NAVAL AIR STATION**

Cone Penetrometer Testing	Shallow HydroPunch	Deep HydroPunch	Surface Soil Sampling	Shallow Wells	Deep Wells	Groundwater Sampling
CPT-RA-02	HPRA-1-A	HPRA-1-C	SSRA-1	M101-A	M101-C	M101-A
CPT-RA-03	HPRA-1-E	HPRA-4-C	SSRA-2	M112-A	DRA-01	M101-C
CPT-RA-04	HPRA-4-A	HPRA-6-C	SSRA-3	M113-A		M102-A
CPT-RA-05	HPRA-4-E	HPRA-8-C	SSRA-4	M114-A		M103-A
CPT-RA-06	HPRA-6-A	HPRA-13-C	SSRA-5	M115-E		M103-B ^a
CPT-RA-07	HPRA-6-E	HPRA-20-C	SSRA-6	M116-E		M104-A
CPT-RA-08	HPRA-8-A	HPRA-23-C	SSRA-7	M117-E		M104-C ^a
CPT-RA-09	HPRA-8-E					M105-A
CPT-RA-10	HPRA-13-A					M105-B ^a
CPT-RA-11	HPRA-13-E					M106-A
CPT-RA-12	HPRA-20-A					M107-A
CPT-RA-13	HPRA-20-E					M108-A
CPT-RA-14	HPRA-23-A					M108-B ^a
CPT-RA-15	HPRA-23-E					M109-A
CPT-RA-16						M110-A
CPT-RA-17						M112-A
CPT-RA-18						M113-A
CPT-RA-19						M114-A
CPT-RA-20						M115-E
CPT-RA-21						M116-E
CPT-RA-22						M117-E
CPT-RA-23						DRA-01

^a Monitoring wells will be sampled during Quarter 1 and Quarter 3 only.

**SUMMARY OF SOIL ORGANIC CHEMICAL ANALYSES FROM THE RUNWAY AREA
CTO 280
ALAMEDA NAVAL AIR STATION**

WELL NO.	SAMPLE DATE	SAMPLE DEPTH (feet bgs)	USCS CLASSIFICATION	FIELD SCREEN (ppm/v)	VOLATILE ORGANIC COMPOUNDS (ug/kg)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/kg)	PESTICIDES, PCB'S AND DIOXINS (ug/kg)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/kg)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/kg)
M101-C	10/17/94	0 0	SP	0 0	ND	FLUORANTHENE 1400 PYRENE 1100	4,4'-DDT 7.4J(h)	TPHC AS MOTOR OIL 390000J(h)	ND
M101-C	10/17/94	2 5	SP	0 0	1,1,1-TRICHLOROETHANE 140 1,1-DICHLOROETHANE 13 1,2-DICHLOROETHENE (TOTAL) 190 ETHYLBENZENE 33 TETRACHLOROETHENE 2100 TOLUENE 91 TRICHLOROETHENE 160 XYLENE (TOTAL) 270	2-METHYLNAPHTHALENE 2500 NAPHTHALENE 5800 PHENANTHRENE 2800	ND	TPHC AS DIESEL 390000J(h)	TPHC AS UNLEADED GASOLINE 2260000J(h)
M101-C	10/17/94	5 0	SP	0 0	1,2-DICHLOROETHENE (TOTAL) 70	FLUORANTHENE 1300 PYRENE 1200	AROCOLOR-1260 87	ND	TPHC AS UNLEADED GASOLINE 4150000J(h)
M112-A	08/22/94	0 0	SW	1 0	NA	ND	ND	ND	ND
M112-A	08/22/94	2 5	SW	1 0	ND	ND	ND	ND	ND
M112-A	08/22/94	5 0	SP	0 0	ND	ND	ND	ND	ND
M113-A	08/11/94	0 0	GM	0 2	ND	ND	ND	TPHC AS MOTOR OIL 440000J(h)	ND
M113-A	08/11/94	2 5	CL	1 4	1,2-DICHLOROETHENE (TOTAL) 190	ND	ND	ND	ND
M113-A	08/11/94	5 0	SP	0 8	1,2-DICHLOROETHENE (TOTAL) 94	ND	ND	ND	ND
M114-A	08/11/94	0 0	SM	0 0	NA	ND	ND	TPHC AS MOTOR OIL 230000J(h)	ND

SUMMARY OF SOIL ORGANIC CHEMICAL ANALYSES FROM THE RUNWAY AREA
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

WELL NO.	SAMPLE DATE	SAMPLE DEPTH (feet bgs)	USCS CLASSIFICATION **	FIELD SCREEN (ppm/v) ***	VOLATILE ORGANIC COMPOUNDS (ug/kg)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/kg)	PESTICIDES, PCB'S AND DIOXINS (ug/kg)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/kg)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/kg)
M114-A	08/11/94	2.5	SM	0.0	ND	ND	ND	ND	ND
M114-A	08/11/94	5.0	SP	0.0	ND	ND	ND	ND	ND
M115-E	08/18/94	0.5	SP	0.0	NA	ND	NA	ND	ND
M115-E	08/18/94	0.5	SP	0.0	ND	ND	NA	ND	ND
M115-E	08/18/94	2.5	SP	0.0	ND	ND	NA	ND	ND
M116-E	08/18/94	0.5	SP	0.2	NA	ND	NA	ND	TPHC AS UNLEADED GASOLINE 1200J(h)
M116-E	08/18/94	2.5	SP	0.2	ND	ND	NA	ND	ND
M116-E	08/18/94	5.0	SP	0.2	ND	ND	NA	ND	ND
M116-E DUP	08/18/94	2.5	SP	0.2	ND	ND	NA	ND	ND
M117-E	08/18/94	0.5	SP	0.5	NA	ND	NA	ND	ND
M117-E	08/18/94	2.5	SP	0.5	ND	ND	NA	ND	ND
M117-E	08/18/94	5.0	SP	0.5	ND	ND	NA	ND	ND

• Sample depth : ..-.. represents the top of an 18-inch sample interval.

** USCS Interpretation (for soil borings only):

GW = well-graded gravel	SW = well-graded sand	ML = inorganic silt and very fine sands	MH = inorganic silts, micaceous or diatomaceous fine sand or silty soils
GP = poorly-graded gravel	SP = poorly-graded sand	CL = inorganic clay, low-med plasticity	CH = inorganic clay, high plasticity
GM = silty gravel	SM = silty sand	OL = organic silts and organic silty clays	OH = organic silt/clay, med - high plasticity
GC = clayey gravel	SC = clayey sand		PT = peat

*** Field screening results were obtained using a photoionization detector calibrated using a 100 ppm/v isobutylene standard gas (for soil borings only).

Analytical Data Comments:	ug/kg = Micrograms per kilogram	ND = Analytes reported below detection limits
	ug/L = Micrograms per liter	NA = Not Analyzed
	J = Value estimated at reported concentration	ppm/v = Parts per million volume
		PCBs = Polychlorinated Biphenyls

Analytical QA/QC Comments:	(a) - Surrogate recovery problem	(e) - Internal standards problems
	(b) - Blank contamination problems	(f) - Calibration problems
	(c) - Matrix spike recovery problems	(g) - Quantification below reporting limit
	(d) - Duplicate (precision) problems	(h) - Other problems, refer to data validation narrative

"--" = Not Applicable

TABLE 7-3

METAL RESULTS IN SOIL EXCEEDING TEN TIMES THE STLC
FROM THE RUNWAY AREA
CTO 280
ALAMEDA NAVAL AIR STATION

Sample Location and Depth	Sample Date	Metal	Detected Concentration (mg/kg)	STLC x 10 (mg/kg) ^(a)
M113-A-0	08/11/94	LEAD	53.6	50.00

Note: ^(a) For the purpose of a screening criteria for this document, soil concentrations have been compared to a value equal to 10 times the STLC.

J - Estimated Concentration

STLC - Solubility Threshold Limit Concentration

SUMMARY OF GROUNDWATER ORGANIC CHEMICAL ANALYSES AND TDS FROM THE RUNWAY AREA
CTO 280
ALAMEDA NAVAL AIR STATION

WELL NO.	WATER BEARING ZONE	SAMPLE DATE	VOLATILE ORGANIC COMPOUNDS (ug/L)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/L)	PESTICIDES, PCB'S AND DIOXINS (ug/L)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/L)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/L)	TOTAL DISSOLVED SOLIDS (mg/L)
DRA-01	2	12/21/94	ND	ND	NA	ND	ND	25000
M101-A	1	12/15/94	1,1,1-TRICHLOROETHANE: 20 1,1-DICHLOROETHANE: 63 1,1-DICHLOROETHENE: 3 1,2-DICHLOROETHENE (TOTAL): 380 ETHYLBENZENE: 5 TETRACHLOROETHENE: 20 TOLUENE: 22 TRICHLOROETHENE: 13 VINYL CHLORIDE: 210 XYLENE (TOTAL): 33	ND	NA	NA	NA	440
M101-C	2	12/16/94	ND	ND	NA	ND	ND	34000
M102-A	1	10/13/94	ND	ND	NA	NA	NA	524
M102-A DUP	1	10/13/94	ND	ND	NA	NA	NA	1180 J(h)
M103-B	2	10/10/94	ND	ND	NA	NA	NA	11300
M105-A	1	12/08/94	ND	ND	NA	ND	ND	280
M105-B	2	10/10/94	ND	ND	NA	NA	NA	23500
M106-A	1	10/12/94	CARBON DISULFIDE: 1J(f)	ND	NA	NA	NA	132 J(h)
M107-A	1	10/12/94	CARBON DISULFIDE: 1J(f)	ND	NA	NA	NA	749 J(h)
M108-A	1	10/12/94	ND	ND	NA	NA	NA	260 J(h)
M108-B	2	10/11/94	ND	ND	NA	NA	NA	26900
M109-A	1	10/13/94	1,2-DICHLOROETHENE (TOTAL): 45 VINYL CHLORIDE: 1	ND	NA	NA	NA	830
M109-A DUP	1	10/13/94	ND	ND	NA	NA	NA	742

SUMMARY OF GROUNDWATER ORGANIC CHEMICAL ANALYSES AND TDS FROM THE RUNWAY AREA

CTO 280
ALAMEDA NAVAL AIR STATION

(Continued)

WELL NO.	WATER BEARING ZONE	SAMPLE DATE	VOLATILE ORGANIC COMPOUNDS (ug/L)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/L)	PESTICIDES, PCB'S AND DIOXINS (ug/L)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/L)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/L)	TOTAL DISSOLVED SOLIDS (mg/L)
M110-A	1	10/13/94	CARBON DISULFIDE 1	ND	NA	NA	NA	1240
M112-A	1	10/13/94	1,1-DICHLOROETHANE 1 1,2-DICHLOROETHENE (TOTAL) 140 VINYL CHLORIDE 13J(f)	ND	NA	TPHC AS MOTOR OIL 960J(h)	TPHC AS UNLEADED GASOLINE 92J(f,h)	530
M113-A	1	10/13/94	1,1-DICHLOROETHANE 4 1,2-DICHLOROETHENE (TOTAL) 6 VINYL CHLORIDE 25	ND	NA	TPHC AS MOTOR OIL 1780J(h)	ND	1720
M114-A	1	10/13/94	ND	ND	NA	ND	ND	2190 J(h)
M115-E	1	10/13/94	1,1-DICHLOROETHANE 2 1,1-DICHLOROETHENE 1	ND	NA	ND	ND	1190 J(h)
M116-E	1	10/13/94	ND	ND	NA	TPHC AS MOTOR OIL 520J(h)	ND	6750
M117-E	1	10/13/94	ND	ND	NA	ND	ND	1300
HPRA-13-A	1	08/16/94	ND	ND	NA	NA	NA	522
HPRA-13-D	1	08/15/94	ND	ND	NA	NA	NA	17900
HPRA-13-E	1	08/15/94	CARBON DISULFIDE 2	ND	NA	NA	NA	18400
HPRA-1-A	1	08/18/94	CARBON DISULFIDE 13J(f)	ND	NA	NA	NA	946
HPRA-1-D	1	08/16/94	ND	ND	NA	NA	NA	21100 J(h)
HPRA-1-E	1	08/16/94	ND	ND	NA	NA	NA	4350 J(h)
HPRA-20-A	1	08/16/94	ND	ND	NA	NA	NA	440
HPRA-20-D	1	08/16/94	CARBON DISULFIDE 210	ND	NA	NA	NA	23600 J(h)
HPRA-20-E	1	08/16/94	ND	ND	NA	NA	NA	6880 J(h)

SUMMARY OF GROUNDWATER ORGANIC CHEMICAL ANALYSES AND TDS FROM THE RUNWAY AREA

CTO 280
ALAMEDA NAVAL AIR STATION

(Continued)

WELL NO.	WATER BEARING ZONE	SAMPLE DATE	VOLATILE ORGANIC COMPOUNDS (ug/L)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/L)	PESTICIDES, PCB'S AND DIOXINS (ug/L)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/L)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/L)	TOTAL DISSOLVED SOLIDS (mg/L)
HPRA-23-A	1	08/17/94	CARBON DISULFIDE 22	ND	NA	NA	NA	1980 J(h)
HPRA-23-D	1	08/17/94	CARBON DISULFIDE 300	ND	NA	NA	NA	24300 J(h)
HPRA-23-E	1	08/18/94	CARBON DISULFIDE 10	ND	NA	NA	NA	23500 J(h)
HPRA-4-A	1	08/15/94	CARBON DISULFIDE 2	ND	NA	NA	NA	850
HPRA-4-D	1	08/15/94	CARBON DISULFIDE 1	ND	NA	NA	NA	39200
HPRA-4-E	1	08/16/94	ND	ND	NA	NA	NA	1110 J(h)
HPRA-4-E DUP	1	08/16/94	ND	ND	NA	NA	NA	1390 J(h)
HPRA-6-A	1	08/10/94	ND	ANTHRACENE 11 BENZO(A)ANTHRACENE 22 BENZO(A)PYRENE 20 BENZO(B)FLUORANTHENE 19 BENZO(G,H,I)PERYLENE 19 CHRYSENE 23 FLUORANTHENE 30 INDENO(1,2,3-CD)PYRENE 16 PHENANTHRENE 29 PYRENE 46	NA	NA	NA	1380 J(h)
HPRA-6-D	1	08/11/94	CARBON DISULFIDE 12	ND	NA	NA	NA	31200
HPRA-6-E	1	08/11/94	CARBON DISULFIDE 3	ND	NA	NA	NA	7860
HPRA-8-A	1	08/10/94	CARBON DISULFIDE 31J(f)	ND	NA	NA	NA	652
HPRA-8-D	1	08/10/94	CARBON DISULFIDE 2J(f)	ND	NA	NA	NA	21700
HPRA-8-E	1	08/10/94	CARBON DISULFIDE 10J(f)	ND	NA	NA	NA	13200

Analytical Data Comments:

ug/kg = Micrograms per kilogram

ug/L = Micrograms per liter

J = Value estimated at reported concentration

SHP = "Shallow" HydroPunch obtained from first water-bearing zone.

DHP = "Deep" HydroPunch obtained from second water-bearing zone.

ND = Analytes reported below detection limits

NA = Not Analyzed

ppm/v = Parts per million volume

PCBs = Polychlorinated Biphenyls

Analytical QA/QC Comments:

(a) - Surrogate recovery problem

(b) - Blank contamination problems

(c) - Matrix spike recovery problems

(d) - Duplicate (precision) problems

(e) - Internal standards problems

(f) - Calibration problems

(g) - Quantification below reporting limit

(h) - Other problems, refer to data validation narrative

TABLE 7-5

**METAL RESULTS IN GROUNDWATER EXCEEDING 95 PERCENT/95 PERCENT STI
FROM THE RUNWAY AREA
CTO 280
ALAMEDA NAVAL AIR STATION**

Sample Location	Sample Date	Metal	Detected Concentration (ug/L)	Upper Tolerance Limit (ug/L) ^(a)
M109-A Dup	10/13/94	LEAD	2.0 J	1
M113-A	10/13/94	COBALT	10.4 J	8.6
	10/13/94	COPPER	37.3	27.7
	10/13/94	LEAD	7.4	1
	10/13/94	NICKEL	63.0	6.6
	10/13/94	ZINC	202	25.7
M115-E	10/13/94	SILVER	10.8	2.4

Note: ^(a) This value represents the upper tolerance interval of the 95 percent/95 percent STI (95/95 STI). The 95/95 STI is the value below which 95 percent of the groundwater samples are expected to fall 95 percent of the time, based on previous groundwater samples collected from NAS Alameda from areas of non-industrial use.

J - Estimated concentration

STI - Statistical Tolerance Interval

SUMMARY OF QUALITY CONTROL ORGANIC CHEMICAL ANALYSES FROM THE RUNWAY AREA
CTO 280
ALAMEDA NAVAL AIR STATION

WELL NO.	SAMPLE DATE	VOLATILE ORGANIC COMPOUNDS (ug/L)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/L)	PESTICIDES, PCB'S AND DIOXINS (ug/L)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/L)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/L)
SRA-ER-01	08/16/94	ND	ND	NA	NA	NA
SRA-ER-02	08/16/94	ND	ND	NA	NA	NA
SRA-ER-03	08/16/94	ND	ND	NA	NA	NA
SRA-ER-04	08/17/94	1,2-DICHLOROETHANE 0.6	ND	NA	NA	NA
SRA-ER-05	08/18/94	ND	ND	NA	NA	NA
SRA-ER-08	08/18/94	ND	ND	NA	ND	ND
SRA-ER-12	08/10/94	ND	ND	NA	NA	NA
SRA-TB	10/17/94	ND	NA	NA	NA	NA
SRA-TB-04	08/18/94	1,2-DICHLOROETHANE 0.6	NA	NA	NA	NA
SRA-TB-05	08/18/94	ND	NA	NA	NA	NA
SRA-TB-06	08/17/94	ND	NA	NA	NA	NA
SRA-TB-19	08/16/94	ND	NA	NA	NA	NA
TB	08/16/94	ND	NA	NA	NA	NA
TB	08/15/94	1,2-DICHLOROETHANE 0.6	NA	NA	NA	NA
TB	08/11/94	ND	NA	NA	NA	NA
TB	10/11/94	1,2-DICHLOROETHANE 1	NA	NA	NA	NA
TB	10/13/94	1,2-DICHLOROETHANE 2	NA	NA	NA	NA
TB	10/12/94	ND	NA	NA	NA	NA

Analytical Data Comments: ug/kg = Micrograms per kilogram

ug/L = Micrograms per liter

J = Value estimated at reported concentration

TB = Trip Blank

ER = Equipment Rinsate

ND = Analytes reported below detection limits

NA = Not Analyzed

ppm/v = Parts per million volume

PCBs = Polychlorinated Biphenyls

Analytical QA/QC Comments: (a) - Surrogate recovery problem

(b) - Blank contamination problems

(c) - Matrix spike recovery problems

(d) - Duplicate (precision) problems

(e) - Internal standards problems

(f) - Calibration problems

(g) - Quantification below reporting limit

(h) - Other problems, refer to data validation narrative

TABLE 8-1

**SUMMARY OF FIELD WORK FOR SITE 3
CTO 280
ALAMEDA NAVAL AIR STATION**

Cone Penetrometer Testing	Deep HydroPunch	Soil Sampling	Shallow Wells	Deep Wells	Groundwater Sampling	Non-Point Source Sampling
CPT-S03-01	DHP-S03-01	CPT-S03-01	M03-04	D03-01	MW97-1	NPS-S03-01
CPT-S03-02	DHP-S03-02	M03-04	M03-05		MW97-2	NPS-S03-02
CPT-S03-03	DHP-S03-03	M03-05	M03-06		MW97-3	NPS-S03-03
CPT-S03-04	DHP-S03-04	M03-06	M03-07		M03-04	NPS-S03-04
CPT-S03-05	DHP-S03-05	M03-07	M03-08A		M03-05	NPS-S03-07
		M03-08			M03-06	
					M03-07	
					M03-08A	
					D03-01	

**SUMMARY OF SOIL ORGANIC CHEMICAL ANALYSES FROM SITE 3
CTO 280
ALAMEDA NAVAL AIR STATION**

WELL NO.	SAMPLE DATE	SAMPLE DEPTH (feet bgs)	USCS CLASSIFICATION ..	FIELD SCREEN (ppmv)	VOLATILE ORGANIC COMPOUNDS (ug/kg)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/kg)	PESTICIDES, PCB'S AND DIOXINS (ug/kg)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/kg)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/kg)
03GPS-036	09/09/94	15			ND	NA	NA	TPHC AS MOTOR OIL: 38000J(h)	ND
03GPS-036	09/09/94	30			ND	NA	NA	ND	ND
03GPS-039	09/09/94	13			ND	NA	NA	TPHC AS MOTOR OIL: 120000J(h)	ND
03GPS-039	09/09/94	30			ND	NA	NA	TPHC AS MOTOR OIL: 460000J(h)	ND
03GPS-039	09/09/94	65			ND	NA	NA	TPHC AS MOTOR OIL: 180000J(h)	ND
03GPS-040	09/12/94	13			ND	NA	NA	TPHC AS MOTOR OIL: 29000J(h)	ND
03GPS-040	09/12/94	30			ND	NA	NA	ND	ND
03GPS-040	09/12/94	55			ND	NA	NA	ND	ND
M03-04	11/06/94	10	GW	00	ACETONE: 140J(f)	NA	NA	ND	ND
M03-04	11/06/94	25	GW	00	ETHYLBENZENE 50000 TOLUENE: 210000 XYLENE (TOTAL) 250000	NA	NA	ND	TPHC AS UNLEADED GASOLINE 19700000J(h)
M03-04	11/06/94	50	SP	25	ETHYLBENZENE 800J(g) TOLUENE 1900 XYLENE (TOTAL) 3900	NA	NA	ND	TPHC AS UNLEADED GASOLINE 90000J(h)

SUMMARY OF SOIL ORGANIC CHEMICAL ANALYSES FROM SITE 3
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

WELL NO.	SAMPLE DATE	SAMPLE DEPTH (feet bgs)	USCS CLASSIFICATION	FIELD SCREEN (ppm/v)	VOLATILE ORGANIC COMPOUNDS (ug/kg)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/kg)	PESTICIDES, PCB'S AND DIOXINS (ug/kg)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/kg)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/kg)
M03-04	11/06/94	10	GW	0.0	ND	NA	NA	TPHC AS MOTOR OIL: 380000J(h)	ND
M03-05	11/20/94	0.0	SP	0.0	ND	NA	NA	TPHC AS MOTOR OIL: 48000J(h)	ND
M03-05	11/20/94	2.5	SP	0.0	ND	NA	NA	TPHC AS MOTOR OIL: 580000J(h)	ND
M03-05	11/20/94	5.0	SP	0.0	ND	NA	NA	ND	ND
M03-06	11/19/94	0.0	SP	0.0	ND	NA	NA	TPHC AS MOTOR OIL: 39000J(h)	ND
M03-06	11/19/94	2.5	SP	0.0	ND	NA	NA	ND	ND
M03-06	11/19/94	5.0	SP	0.5	ND	NA	NA	TPHC AS MOTOR OIL: 44000J(h)	ND
M03-07	11/20/94	0.0	CL	0.0	ND	NA	NA	TPHC AS MOTOR OIL: 374000J(h)	ND
M03-07	11/20/94	2.5	CL	0.0	2-BUTANONE: 240J(f) ACETONE: 580J(f)	NA	NA	TPHC AS MOTOR OIL: 150000J(h)	ND
M03-07	11/20/94	5.0	CL	0.0	ND	NA	NA	TPHC AS MOTOR OIL: 24000J(h)	ND
M03-08	11/06/94	0.0	SP	0.0	ND	NA	NA	ND	ND
M03-08	11/06/94	2.5	SP	0.0	ND	NA	NA	TPHC AS MOTOR OIL: 60000J(h)	ND

SUMMARY OF SOIL ORGANIC CHEMICAL ANALYSES FROM SITE 3
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

WELL NO.	SAMPLE DATE	SAMPLE DEPTH (feet bgs)	USCS CLASSIFICATION **	FIELD SCREEN (ppmv) ***	VOLATILE ORGANIC COMPOUNDS (ug/kg)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/kg)	PESTICIDES, PCB'S AND DIOXINS (ug/kg)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/kg)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/kg)
M03-08	11/06/94	5.0	SP	0.0	ND	NA	NA	TPHC AS MOTOR OIL: 660000J(h)	ND
CPT-S03-01	08/31/94	0.0	--	--	ND	NA	NA	ND	TPHC AS UNLEADED GASOLINE 1400J(h)
CPT-S03-01	08/31/94	2.5	--	--	XYLENE (TOTAL): 2300	NA	NA	TPHC AS MOTOR OIL: 123000J(h)	TPHC AS UNLEADED GASOLINE 62000J(h)
CPT-S03-01	08/31/94	5.0	--	--	XYLENE (TOTAL): 24000	NA	NA	TPHC AS MOTOR OIL: 67000J(h)	TPHC AS UNLEADED GASOLINE 1040000J(h)
GPS03-015	08/16/94	1.0	--	--	ND	NA	NA	TPHC AS MOTOR OIL: 49000J(h)	ND
GPS03-015	08/16/94	3.0	--	--	ND	NA	NA	ND	ND
GPS03-015	08/16/94	5.0	--	--	ND	NA	NA	TPHC AS MOTOR OIL: 30000J(h)	ND
GPS03-017	08/16/94	1.0	--	--	ND	NA	NA	TPHC AS MOTOR OIL: 1660000J(h)	TPHC AS UNLEADED GASOLINE 5300J(h)
GPS03-017	08/16/94	3.0	--	--	ND	NA	NA	TPHC AS MOTOR OIL: 29000J(h)	TPHC AS UNLEADED GASOLINE 630J(h)
GPS03-017	08/16/94	5.5	--	--	ETHYLBENZENE 130 TOLUENE 360 XYLENE (TOTAL) 500	NA	NA	TPHC AS MOTOR OIL: 86000J(h)	TPHC AS UNLEADED GASOLINE 3950000J(h)

SUMMARY OF SOIL ORGANIC CHEMICAL ANALYSES FROM SITE 3
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

WELL NO.	SAMPLE DATE	SAMPLE DEPTH (feet bgs)	USCS CLASSIFICATION **	FIELD SCREEN (ppm/v) ***	VOLATILE ORGANIC COMPOUNDS (ug/kg)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/kg)	PESTICIDES, PCB'S AND DIOXINS (ug/kg)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/kg)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/kg)
GPS03-020	08/17/94	10	--	--	ND	NA	NA	TPHC AS MOTOR OIL: 220000J(h)	ND
GPS03-020	08/17/94	30	--	--	ND	NA	NA	TPHC AS MOTOR OIL: 30000J(h)	ND
GPS03-020	08/17/94	55	--	--	ND	NA	NA	TPHC AS MOTOR OIL: 48000J(h)	ND
GPS03-025	08/18/94	10	--	--	ND	NA	NA	ND	ND
GPS03-025	08/18/94	30	--	--	ND	NA	NA	ND	ND
GPS03-025	08/18/94	60	--	--	ND	NA	NA	ND	ND

* Sample depth indicated represents the top of an 18-inch sample interval.

** USCS Interpretation (for soil borings only):

GW = well-graded gravel	SW = well-graded sand	ML = inorganic silt and very fine sands	MH = inorganic silts, micaceous or diatomaceous fine sand or silty soils
GP = poorly-graded gravel	SP = poorly-graded sand	CL = inorganic clay, low-med plasticity	CH = inorganic clay, high plasticity
GM = silty gravel	SM = silty sand	OL = organic silts and organic silty clays	OH = organic silt/clay, med - high plasticity
GC = clayey gravel	SC = clayey sand		PT = peat

*** Field screening results were obtained using a photoionization detector calibrated using a 100 ppm/v isobutylene standard gas (for soil borings only).

Analytical Data Comments: ug/kg = Micrograms per kilogram

ND = Analytes reported below detection limits

ug/L = Micrograms per liter

NA = Not Analyzed

J = Value estimated at reported concentration

ppm/v = Parts per million volume

PCBs = Polychlorinated Biphenyls

Analytical QA/QC Comments:

- (a) - Surrogate recovery problem
- (b) - Blank contamination problems
- (c) - Matrix spike recovery problems
- (d) - Duplicate (precision) problems

- (e) - Internal standards problems
- (f) - Calibration problems
- (g) - Quantification below reporting limit
- (h) - Other problems, refer to data validation narrative

"-" = Not Applicable

CPT = Soil Sample obtained with hand-auger sampling tool.

GPS = Soil Sample obtained with GeoProbe device.

TABLE 8-3

**METAL RESULTS IN SOIL EXCEEDING TEN TIMES THE STLC
FROM SITE 3
CTO 280
ALAMEDA NAVAL AIR STATION**

Sample Location and Depth	Sample Date	Metal	Detected Concentration (mg/kg)	STLC x 10 (mg/kg) ^(a)
CPT-S03-01-5	08/31/94	LEAD	52.2 J	50.00
M03-06-5	11/19/94	LEAD	93.4	50.00
M03-07-0	11/20/94	LEAD	124	50.00
M03-07-2.5	11/20/94	BARIUM	1060	1000.00
	11/20/94	LEAD	2380	50.00

Note: ^(a) For the purpose of a screening criteria for this document, soil concentrations have been compared to a value equal to 10 times the STLC.

J - Estimated Concentration

STLC - Solubility Threshold Limit Concentration

SUMMARY OF GROUNDWATER ORGANIC CHEMICAL ANALYSES AND TDS FROM SITE 3
CTO 280
ALAMEDA NAVAL AIR STATION

WELL NO.	WATER BEARING ZONE	SAMPLE DATE	VOLATILE ORGANIC COMPOUNDS (ug/L)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/L)	PESTICIDES, PCB'S AND DIOXINS (ug/L)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/L)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/L)	TOTAL DISSOLVED SOLIDS (mg/L)
03GPW-R1	0	09/07/94	ND	NA	NA	NA	ND	NA
03GPW-032	0	09/12/94	ND	NA	NA	TPHC AS MOTOR OIL: 600J(h)	ND	NA
03GPW-036	0	09/09/94	CARBON DISULFIDE 1	NA	NA	TPHC AS MOTOR OIL: 610J(h)	ND	NA
03GPW-038	0	09/12/94	XYLENE (TOTAL) 2	NA	NA	TPHC AS MOTOR OIL: 1000J(h)	ND	NA
03GPW-039	0	09/09/94	ND	NA	NA	TPHC AS MOTOR OIL: 390J(h)	ND	NA
03GPW-501	0	09/09/94	ND	NA	NA	ND	ND	NA
03GPW-502	0	09/12/94	ND	NA	NA	ND	ND	NA
03GPW-503	0	09/15/94	ND	NA	NA	NA	NA	NA
03GPW-901	0	09/12/94	ND	NA	NA	NA	NA	NA
D03-01	2	12/14/94	ETHYLBENZENE 2 TOLUENE 6 XYLENE (TOTAL) 8	ND	NA	ND	TPHC AS UNLEADED GASOLINE 250J(h)	35000
M03-04	1	12/15/94	ND	ND	NA	TPHC AS MOTOR OIL: 640J(h)	ND	1400
M03-05	1	12/08/94	ND	ND	NA	TPHC AS DIESEL: 1200J(h)	TPHC AS UNLEADED GASOLINE 130J(h)	1700
M03-06	1	12/08/94	1,1,1-TRICHLOROETHANE 2 1,1-DICHLOROETHANE 74 1,1-DICHLOROETHENE 7 1,2-DICHLOROETHENE (TOTAL) 2 CHLOROETHANE 81J(f)	ND	NA	TPHC AS MOTOR OIL: 2100J(f,h)	ND	1300
M03-07	1	12/15/94	BENZENE 36 XYLENE (TOTAL) 79	2,4-DIMETHYLPHENOL 39 2-METHYLPHENOL 19 PHENOL 180	NA	TPHC AS DIESEL: 2000J(h)	TPHC AS UNLEADED GASOLINE 7500J(h)	9100

SUMMARY OF GROUNDWATER ORGANIC CHEMICAL ANALYSES AND TDS FROM SITE 3
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

WELL NO.	WATER BEARING ZONE	SAMPLE DATE	VOLATILE ORGANIC COMPOUNDS (ug/L)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/L)	PESTICIDES, PCB'S AND DIOXINS (ug/L)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/L)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/L)	TOTAL DISSOLVED SOLIDS (mg/L)
M03-08A	1	12/09/94	ND	ND	ND	TPHC AS MOTOR OIL: 560J(h)	ND	27000
MW97-1	1	10/14/94	ND	ND	NA	TPHC AS MOTOR OIL: 1200J(h)	ND	5510 J(h)
MW97-1 DUP	1	10/14/94	ND	ND	NA	TPHC AS MOTOR OIL: 1160J(h)	ND	6750
MW97-2	1	10/18/94	ND	ND	NA	TPHC AS MOTOR OIL: 2370J(h)	ND	23500
MW97-3	1	10/14/94	ND	ND	NA	ND	ND	746
DHP-S03-01	2	09/06/94	ND	NA	NA	NA	NA	52500
DHP-S03-02	2	08/05/94	ND	NA	NA	NA	NA	53600
DHP-S03-03	2	08/29/94	ND	NA	NA	NA	NA	9570
DHP-S03-04	2	08/05/94	ND	ND	NA	NA	NA	6800
DHP-S03-05	2	08/31/94	2-BUTANONE 71J(f) CHLOROFORM 2	NA	NA	NA	NA	20400
GPW03-001	1	08/10/94	ND	NA	NA	ND	ND	NA
GPW03-002	1	08/11/94	CARBON DISULFIDE 2 TRICHLOROETHENE 1	NA	NA	ND	TPHC AS UNLEADED GASOLINE 450J(h)	NA
GPW03-140	1	08/15/94	ND	NA	NA	ND	ND	NA
GPW03-150	1	08/16/94	ND	NA	NA	TPHC AS MOTOR OIL: 990J(h)	TPHC AS UNLEADED GASOLINE 210J(h)	NA
GPW03-170	1	08/16/94	BENZENE 6 ETHYLBENZENE 3 TOLUENE 21 XYLENE (TOTAL) 13	NA	NA	TPHC AS MOTOR OIL: 730J(h)	TPHC AS UNLEADED GASOLINE 260J(h)	NA

SUMMARY OF GROUNDWATER ORGANIC CHEMICAL ANALYSES AND TDS FROM SITE 3
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

WELL NO.	WATER BEARING ZONE	SAMPLE DATE	VOLATILE ORGANIC COMPOUNDS (ug/L)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/L)	PESTICIDES, PCB'S AND DIOXINS (ug/L)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/L)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/L)	TOTAL DISSOLVED SOLIDS (mg/L)
GPW03-180	1	08/16/94	ND	NA	NA	ND	ND	NA
GPW03-199	1	08/16/94	ND	NA	NA	NA	NA	NA
GPW03-240	1	08/18/94	XYLENE (TOTAL) 2	NA	NA	TPHC AS MOTOR OIL: 860J(h)	ND	NA
GPW03-241	1	08/18/94	ND	NA	NA	ND	ND	NA
GPW03-242	1	08/18/94	ND	NA	NA	NA	NA	NA
GPW03-900	1	08/12/94	NA	NA	NA	TPHC AS MOTOR OIL: 870J(f)	ND	NA
GPW03-901	1	08/12/94	ND	NA	NA	NA	NA	NA

Analytical Data Comments: ug/kg = Micrograms per kilogram

ug/L = Micrograms per liter

J = Value estimated at reported concentration

SHP = "Shallow" HydroPunch obtained from first water-bearing zone.

DHP = "Deep" HydroPunch obtained from second water-bearing zone.

ND = Analytes reported below detection limits

NA = Not Analyzed

ppm/v = Parts per million volume

PCBs = Polychlorinated Biphenyls

Analytical QA/QC Comments: (a) - Surrogate recovery problem
 (b) - Blank contamination problems
 (c) - Matrix spike recovery problems
 (d) - Duplicate (precision) problems

(e) - Internal standards problems
 (f) - Calibration problems
 (g) - Quantification below reporting limit
 (h) - Other problems, refer to data validation narrative

GPW = GeoProbe Sample from First Water Bearing Zone.

TABLE 8-5

**METAL RESULTS IN GROUNDWATER EXCEEDING 95 PERCENT/95 PERCENT STI
FROM SITE 3
CTO 280
ALAMEDA NAVAL AIR STATION**

Sample Location	Sample Date	Metal	Detected Concentration (ug/L)	Upper Tolerance Limit (ug/L) ^(a)
M03-04	12/14/94	BERYLLIUM	2.2 J	1.3
	12/14/94	CHROMIUM	3.6 J	3.2
	12/14/94	LEAD	1.1 J	1
M03-05	12/08/94	NICKEL	17.0 J	6.6
M03-06	12/08/94	ARSENIC	67.3	36.3
M03-07	12/14/94	BERYLLIUM	1.8 J	1.3
	12/14/94	LEAD	7.9	1
MW97-2	10/18/94	MERCURY	0.24	0.1

Note: ^(a) This value represents the upper tolerance interval of the 95 percent/95 percent STI (95/95 STI). The 95/95 STI is the value below which 95 percent of the groundwater samples are expected to fall 95 percent of the time, based on previous groundwater samples collected from NAS Alameda from areas of non-industrial use.

J - Estimated concentration

STI - Statistical Tolerance Interval

SUMMARY OF NON POINT SOURCE ORGANIC CHEMICAL ANALYSES FROM SITE 3
CTO 280
ALAMEDA NAVAL AIR STATION

NPS I.D.	SAMPLE DATE	VOLATILE ORGANIC COMPOUNDS (ug/kg)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/kg)	PESTICIDES, PCB'S AND DIOXINS (ug/kg)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/kg)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/kg)
NPS-S03-01	07/18/94	1,1,1-TRICHLOROETHANE: 21	FLUORANTHENE: 1400 PHENANTHRENE: 1500 PYRENE: 1000J(g)	NA	TPHC AS MOTOR OIL: 2230000J(h)	ND
NPS-S03-02	07/20/94	ND	BENZO(A)ANTHRACENE: 2800 BENZO(A)PYRENE: 2600 BENZO(B)FLUORANTHENE: 4600 CHRYSENE: 2900 FLUORANTHENE: 2500 PYRENE: 2200	NA	TPHC AS MOTOR OIL: 2480000J(h)	ND
NPS-S03-03	07/18/94	ND	ND	NA	TPHC AS MOTOR OIL: 910000J(h)	ND
NPS-S03-04	07/18/94	ND	ANTHRACENE: 2300 BENZO(A)ANTHRACENE: 1400J(g) BENZO(B)FLUORANTHENE: 1500 CHRYSENE: 1700 FLUORANTHENE: 4800 PHENANTHRENE: 2800 PYRENE: 3300	NA	TPHC AS MOTOR OIL: 3620000J(f,h)	ND
NPS-S03-07	07/18/94	TOLUENE 51	ND	NA	TPHC AS MOTOR OIL: 1570000J(f,h)	TPHC AS UNLEADED GASOLINE 1800J(h)

Analytical Data Comments: ug/kg = Micrograms per kilogram

ug/L = Micrograms per liter

J = Value estimated at reported concentration

ND = Analytes reported below detection limits

NA = Not Analyzed

ppm/v = Parts per million volume

PCBs = Polychlorinated Biphenyls

Analytical QA/QC Comments: (a) - Surrogate recovery problem
 (b) - Blank contamination problems
 (c) - Matrix spike recovery problems
 (d) - Duplicate (precision) problems

(e) - Internal standards problems
 (f) - Calibration problems
 (g) - Quantification below reporting limit
 (h) - Other problems, refer to data validation narrative

SUMMARY OF QUALITY CONTROL ORGANIC CHEMICAL ANALYSES FROM SITE 3
CTO 280
ALAMEDA NAVAL AIR STATION

WELL NO.	SAMPLE DATE	VOLATILE ORGANIC COMPOUNDS (ug/L)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/L)	PESTICIDES, PCB'S AND DIOXINS (ug/L)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/L)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/L)
S03-ER-01	07/18/94	ND	ND	NA	ND	ND
S03-ER-02	08/05/94	ND	ND	NA	NA	NA
S03-ER-03	11/06/94	ND	NA	NA	ND	ND
S03-ER-04	11/19/94	ND	NA	NA	ND	ND
S03-ER-06	08/29/94	1,2-DICHLOROETHANE 07	NA	NA	NA	NA
S03-TB-01	07/18/94	ND	NA	NA	NA	NA
S03-TB-02	08/05/94	ND	NA	NA	NA	NA
S03-TB-03	09/06/94	1,2-DICHLOROETHANE 1	NA	NA	NA	NA
S03-TB-06	08/29/94	1,2-DICHLOROETHANE 1	NA	NA	NA	NA
TB	10/14/94	1,2-DICHLOROETHANE 2	NA	NA	NA	NA

Analytical Data Comments: ug/kg = Micrograms per kilogram

ug/L = Micrograms per liter

J = Value estimated at reported concentration

TB = Trip Blank

ER = Equipment Rinsate

ND = Analytes reported below detection limits

NA = Not Analyzed

ppm/v = Parts per million volume

PCBs = Polychlorinated Biphenyls

Analytical QA/QC Comments: (a) - Surrogate recovery problem
 (b) - Blank contamination problems
 (c) - Matrix spike recovery problems
 (d) - Duplicate (precision) problems

(e) - Internal standards problems
 (f) - Calibration problems
 (g) - Quantification below reporting limit
 (h) - Other problems, refer to data validation narrative

TABLE 9-1

**SUMMARY OF FIELD WORK FOR SITE 6
CTO 280
ALAMEDA NAVAL AIR STATION**

Cone Penetrometer Testing	Deep HydroPunch	Shallow Soil Sampling	Shallow Wells	Groundwater Sampling	Non-Point Source Sampling
CPT-S06-01	DHP-S06-01	B06-20	M06-06	M06-01	NPS-S06-01
CPT-S06-02	DHP-S06-02	B06-21		M06-02	NPS-S06-02
CPT-S06-03	DHP-S06-03	B06-22		M06-03	NPS-S06-03
CPT-S06-04	DHP-S06-04	B06-23		M06-04	
		M06-06		M06-05	
				M06-06	

**SUMMARY OF SOIL ORGANIC CHEMICAL ANALYSES FROM SITE 6
CTO 280
ALAMEDA NAVAL AIR STATION**

WELL NO.	SAMPLE DATE	SAMPLE DEPTH (feet bgs)	USCS CLASSIFICATION **	FIELD SCREEN (ppm/v) ***	VOLATILE ORGANIC COMPOUNDS (ug/kg)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/kg)	PESTICIDES, PCB'S AND DIOXINS (ug/kg)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/kg)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/kg)
B06-20	08/11/94	0 0	SP	1 1	ND	ND	NA	NA	NA
B06-20	08/11/94	2 5	SP	1 1	ND	ACENAPHTHYLENE 430 ANTHRACENE 780 BENZO(A)ANTHRACENE 3600 BENZO(A)PYRENE 3200 BENZO(B)FLUORANTHENE 4300 BENZO(G,H,I)PERYLENE 2400 CHRYSENE 2500 DIBENZ(A,H)ANTHRACENE 560 FLUORANTHENE 7500 INDENO(1,2,3-CD)PYRENE 2200 PHENANTHRENE 3500 PYRENE 10000	NA	NA	NA
B06-20	08/11/94	5 0	SM	1 1	ND	ND	NA	NA	NA
B06-20	08/11/94	10	CL	2 0	ND	BENZO(A)PYRENE 2300 BENZO(B)FLUORANTHENE 2800 BENZO(G,H,I)PERYLENE 1900 FLUORANTHENE 4500 PHENANTHRENE 2800 PYRENE 8900	NA	NA	NA
B06-20	08/11/94	14	SC	0 5	ND	ND	NA	NA	NA
B06-21	08/11/94	0 0	SP-SM	0 0	ND	ND	NA	NA	NA
B06-21	08/11/94	2 5	SP-SM	0 0	ND	ND	NA	NA	NA
B06-21	08/11/94	5 0	SC	0 1	ND	ND	NA	NA	NA

SUMMARY OF SOIL ORGANIC CHEMICAL ANALYSES FROM SITE 6
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

WELL NO.	SAMPLE DATE	SAMPLE DEPTH (feet bgs)	USCS CLASSIFICATION **	FIELD SCREEN (ppm/v) ***	VOLATILE ORGANIC COMPOUNDS (ug/kg)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/kg)	PESTICIDES, PCB'S AND DIOXINS (ug/kg)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/kg)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/kg)
B06-21	08/11/94	10	CL	0.5	ND	BENZO(A)PYRENE 1600 BENZO(B)FLUORANTHENE 1800 PYRENE 3800	NA	NA	NA
B06-21	08/11/94	14	SC	0.8	1,2-DICHLOROETHENE (TOTAL) 26	ND	NA	NA	NA
B06-22	08/11/94	0.0	SP-SM	0.1	ND	ND	NA	NA	NA
B06-22	08/11/94	2.5	SP-SM	0.1	ND	ND	NA	NA	NA
B06-22	08/11/94	5.0	SP-SM	0.1	ND	ND	NA	NA	NA
B06-22	08/11/94	10	SC	0.8	ND	BENZO(A)ANTHRACENE 710 BENZO(A)PYRENE 2200 BENZO(B)FLUORANTHENE 3000 BENZO(G,H,I)PERYLENE 2400 CHRYSENE 830 FLUORANTHENE 2000J(e) INDENO(1,2,3-CD)PYRENE 1800 PYRENE 9400	NA	NA	NA
B06-22	08/11/94	14	CL	0.0	1,2-DICHLOROETHENE (TOTAL) 16	ND	NA	NA	NA
B06-23	08/11/94	0.0	SP-SM	0.0	ND	ND	NA	NA	NA
B06-23	08/11/94	2.5	SP-SM	0.0	ND	ND	NA	NA	NA
B06-23	08/11/94	5.0	SP-SM	0.0	ND	ND	NA	NA	NA

SUMMARY OF SOIL ORGANIC CHEMICAL ANALYSES FROM SITE 6
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

WELL NO.	SAMPLE DATE	SAMPLE DEPTH (feet bgs)	USCS CLASSIFICATION **	FIELD SCREEN (ppm/v) ***	VOLATILE ORGANIC COMPOUNDS (ug/kg)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/kg)	PESTICIDES, PCB'S AND DIOXINS (ug/kg)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/kg)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/kg)
B06-23	08/11/94	10	SC	0.0	ND	BENZO(A)PYRENE 710 BENZO(B)FLUORANTHENE 920 BENZO(G,H,I)PERYLENE 800 FLUORANTHENE 590 INDENO(1,2,3-CD)PYRENE 560 PYRENE 2800	NA	NA	NA
B06-23	08/11/94	14	CL	0.0	ND	ND	NA	NA	NA
M06-06	08/22/94	0.0	SP	0.0	ND	ND	NA	NA	NA
M06-06	08/22/94	2.5	SP	0.0	ND	ND	NA	NA	NA
M06-06	08/22/94	5.0	SP	0.0	ND	ND	NA	NA	NA
M06-06	08/22/94	10	CL	0.0	ND	BENZO(A)ANTHRACENE 900 BENZO(A)PYRENE 1400J(e) BENZO(B)FLUORANTHENE 2500J(e) CHRYSENE 980 FLUORANTHENE 2800 INDENO(1,2,3-CD)PYRENE 1500J(e,g) PYRENE 7100	NA	NA	NA
M06-06	08/22/94	14	CL	0.0	ND	ND	NA	NA	NA

* Sample depth indicated represents the top of an 18-inch sample interval.

** USCS Interpretation (for soil borings only):

GW = well-graded gravel	SW = well-graded sand	ML = inorganic silt and very fine sands	MH = inorganic silts, micaceous or diatomaceous fine sand or silty soils
GP = poorly-graded gravel	SP = poorly-graded sand	CL = inorganic clay, low-med plasticity	CH = inorganic clay, high plasticity
GM = silty gravel	SM = silty sand	OL = organic silts and organic silty clays	OH = organic silt/clay, med - high plasticity
GC = clayey gravel	SC = clayey sand		PT = peat

*** Field screening results were obtained using a photoionization detector calibrated using a 100 ppm/v isobutylene standard gas (for soil borings only).

Analytical Data Comments:	ug/kg = Micrograms per kilogram	ND = Analytes reported below detection limits
	ug/L = Micrograms per liter	NA = Not Analyzed
	J = Value estimated at reported concentration	ppm/v = Parts per million volume
		PCBs = Polychlorinated Biphenyls

Analytical QA/QC Comments:	(a) - Surrogate recovery problem	(e) - Internal standards problems
	(b) - Blank contamination problems	(f) - Calibration problems
	(c) - Matrix spike recovery problems	(g) - Quantification below reporting limit
	(d) - Duplicate (precision) problems	(h) - Other problems, refer to data validation narrative

"--" = Not Applicable

SUMMARY OF GROUNDWATER ORGANIC CHEMICAL ANALYSES AND TDS FROM SITE 6
CTO 280
ALAMEDA NAVAL AIR STATION

WELL NO.	WATER BEARING ZONE	SAMPLE DATE	VOLATILE ORGANIC COMPOUNDS (ug/L)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/L)	PESTICIDES, PCB'S AND DIOXINS (ug/L)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/L)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/L)	TOTAL DISSOLVED SOLIDS (mg/L)
M06-01	1	11/11/94	1,2-DICHLOROETHENE (TOTAL) 6 TETRACHLOROETHENE 1 TRICHLOROETHENE 7 VINYL CHLORIDE 2	ND	ND	ND	ND	1140
M06-02	1	11/29/94	1,1-DICHLOROETHANE 2 1,2-DICHLOROETHENE (TOTAL) 18 TRICHLOROETHENE 15 VINYL CHLORIDE 1	ND	ND	ND	ND	370
M06-02 DUP	1	11/29/94	1,1-DICHLOROETHANE 2 1,2-DICHLOROETHENE (TOTAL) 17 TRICHLOROETHENE 13 VINYL CHLORIDE 0.8	ND	ND	ND	ND	440
M06-03	1	11/11/94	ND	ND	ND	ND	ND	2820
M06-04	1	11/10/94	CHLOROFORM 16	ND	ND	ND	ND	118
M06-05	1	11/10/94	ND	ND	ND	ND	ND	748
M06-06	1	11/30/94	1,1-DICHLOROETHANE 41 1,1-DICHLOROETHENE 16 1,2-DICHLOROETHENE (TOTAL) 70 CHLOROMETHANE 2 TETRACHLOROETHENE 10 TRICHLOROETHENE 10	ND	ND	ND	TPHC AS UNLEADED GASOLINE 56J(h)	1900
DHP-S06-01	2	08/17/94	ND	ND	NA	NA	NA	32400 J(h)
DHP-S06-02	2	08/17/94	ACETONE 27J(f)	ND	NA	NA	NA	10500 J(h)
DHP-S06-03	2	08/18/94	ND	ND	NA	NA	NA	33800
DHP-S06-04	2	08/18/94	2-BUTANONE 78J(f) CHLOROMETHANE 3	ND	NA	NA	NA	47800

Analytical Data

Comments: ug/kg = Micrograms per kilogram

ug/L = Micrograms per liter

J = Value estimated at reported concentration

SHP = "Shallow" HydroPunch obtained from first water-bearing zone.

DHP = "Deep" HydroPunch obtained from second water-bearing zone.

ND = Analytes reported below detection limits

NA = Not Analyzed

ppm/v = Parts per million volume

PCBs = Polychlorinated Biphenyls

Analytical QA/QC Comments:

(a) - Surrogate recovery problem

(b) - Blank contamination problems

(c) - Matrix spike recovery problems

(d) - Duplicate (precision) problems

(e) - Internal standards problems

(f) - Calibration problems

(g) - Quantification below reporting limit

(h) - Other problems, refer to data validation narrative

TABLE 9-4

**METAL RESULTS IN GROUNDWATER EXCEEDING 95 PERCENT/95 PERCENT STI
FROM SITE 6
CTO 280
ALAMEDA NAVAL AIR STATION**

Sample Location	Sample Date	Metal	Detected Concentration (ug/L)	Upper Tolerance Limit (ug/L) ^(a)
M06-01	11/11/94	MERCURY	0.62 J	0.1
	11/11/94	NICKEL	11.9 J	6.6
M06-03	11/11/94	BERYLLIUM	1.4 J	1.3
M06-04	11/10/94	BERYLLIUM	1.4 J	1.3
M06-05	11/10/94	BERYLLIUM	1.4 J	1.3
M06-06	11/30/94	SELENIUM	3.3 J	1.0

Note: ^(a) This value represents the upper tolerance interval of the 95 percent/95 percent STI (95/95 STI). The 95/95 STI is the value below which 95 percent of the groundwater samples are expected to fall 95 percent of the time, based on previous groundwater samples collected from NAS Alameda from areas of non-industrial use.

J - Estimated concentration

STI - Statistical Tolerance Interval

SUMMARY OF NON POINT SOURCE ORGANIC CHEMICAL ANALYSES FROM SITE 6
CTO 280
ALAMEDA NAVAL AIR STATION

NPS I.D.	SAMPLE DATE	VOLATILE ORGANIC COMPOUNDS (ug/kg)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/kg)	PESTICIDES, PCB'S AND DIOXINS (ug/kg)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/kg)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/kg)
NPS-S06-01	07/19/94	1,1,1-TRICHLOROETHANE 160000 TRICHLOROETHENE 52000	ND	NA	TPHC AS MOTOR OIL: 650000J(h)	TPHC AS UNLEADED GASOLINE 37000J(h)
NPS-S06-02	07/19/94	ND	ND	NA	TPHC AS MOTOR OIL: 1060000J(h)	TPHC AS UNLEADED GASOLINE 8200J(h)
NPS-S06-03	07/19/94	ND	PENTACHLOROPHENOL: 3000J(f)	NA	TPHC AS MOTOR OIL: 640000J(h)	ND

Analytical Data Comments: ug/kg = Micrograms per kilogram

ug/L = Micrograms per liter

J = Value estimated at reported concentration

ND = Analytes reported below detection limits

NA = Not Analyzed

ppm/v = Parts per million volume

PCBs = Polychlorinated Biphenyls

Analytical QA/QC Comments:

(a) - Surrogate recovery problem

(b) - Blank contamination problems

(c) - Matrix spike recovery problems

(d) - Duplicate (precision) problems

(e) - Internal standards problems

(f) - Calibration problems

(g) - Quantification below reporting limit

(h) - Other problems, refer to data validation narrative

SUMMARY OF QUALITY CONTROL ORGANIC CHEMICAL ANALYSES FROM SITE 6
CTO 280
ALAMEDA NAVAL AIR STATION

WELL NO.	SAMPLE DATE	VOLATILE ORGANIC COMPOUNDS (ug/L)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/L)	PESTICIDES, PCB'S AND DIOXINS (ug/L)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/L)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/L)
S06-ER-01	08/11/94	1,2-DICHLOROETHANE 1	ND	NA	NA	NA
S06-ER-02	08/17/94	ND	ND	NA	NA	NA
S06-ER-03	08/18/94	CARBON DISULFIDE 2(J)	ND	NA	NA	NA
S06-TB-01	08/17/94	1,2-DICHLOROETHANE 0.8	NA	NA	NA	NA
S06-TB-02	08/18/94	ND	NA	NA	NA	NA

Analytical Data Comments: ug/kg = Micrograms per kilogram

ug/L = Micrograms per liter

J = Value estimated at reported concentration

TB = Trip Blank

ER = Equipment Rinsate

ND = Analytes reported below detection limits

NA = Not Analyzed

ppm/v = Parts per million volume

PCBs = Polychlorinated Biphenyls

Analytical QA/QC Comments: (a) - Surrogate recovery problem
 (b) - Blank contamination problems
 (c) - Matrix spike recovery problems
 (d) - Duplicate (precision) problems

(e) - Internal standards problems
 (f) - Calibration problems
 (g) - Quantification below reporting limit
 (h) - Other problems, refer to data validation narrative

TABLE 10-1

**SUMMARY OF FIELD WORK FOR SITE 7A
CTO 280
ALAMEDA NAVAL AIR STATION**

Cone Penetrometer Testing	Deep HydroPunch	Shallow HydroPunch	Surface Soil Sampling	Shallow Soil Sampling	Shallow Wells	Deep Wells	Groundwater Sampling	Non-Point Source Sampling
CPT-S07A-01	DHP-S07A-01	SHP-S07A-05 ^a	S07A-01	B07A-08	M07A-08	D7A-01	W-1	NPS-S7A-02
CPT-S07A-02	DHP-S07A-02	SHP-S07A-06 ^a	S07A-02	B07A-09	M07A-09	D7A-02	W-2	NPS-S7A-03
CPT-S07A-03	DHP-S07A-03	SHP-S07A-07 ^a		B07A-10		D7A-03	W-3	
CPT-S07A-04	DHP-S07A-04	SHP-S07A-08 ^a		B07A-11			M07A-01	
CPT-S07A-05		SHP-S07A-09 ^a		B07A-12			M07A-02	
CPT-S07A-06		SHP-S07A-10 ^a		M07A-08			M07A-03	
CPT-S07A-07		SHP-S07A-11 ^a		M07A-09			M07A-04	
CPT-S07A-08		DHP-S07A-05 ^b					M07A-05	
CPT-S07A-09		DHP-S07A-07 ^b					M07A-06	
CPT-S07A-10		DHP-S07A-09 ^b					M07A-07	
CPT-S07A-11							M07A-08	
							M07A-09	
							D7A-01	
							D7A-02	
							D7A-03	

^a HydroPunch samples obtained from top of first water-bearing zone from a depth of approximately 6 feet bgs.

^b HydroPunch samples were obtained from the Holocene Bay Mud unit from a depth of approximately 16 feet bgs.

**SUMMARY OF SOIL ORGANIC CHEMICAL ANALYSES FROM SITE 7A
CTO 280
ALAMEDA NAVAL AIR STATION**

WELL NO.	SAMPLE DATE	SAMPLE DEPTH (feet bgs)	USCS CLASSIFICATION **	FIELD SCREEN (ppm/v) ***	VOLATILE ORGANIC COMPOUNDS (ug/kg)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/kg)	PESTICIDES, PCB'S AND DIOXINS (ug/kg)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/kg)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/kg)
M07A-08	11/20/94	0 0	GM	0 0	ND	NA	NA	TPHC AS MOTOR OIL: 32000J(h)	ND
M07A-08	11/20/94	2 5	GM	0 0	ND	NA	NA	TPHC AS MOTOR OIL: 67000J(h)	ND
M07A-08	11/20/94	5 0	CL	0 0	ND	NA	NA	TPHC AS MOTOR OIL: 72000J(h)	ND
M07A-09	11/20/94	0 0	GM	0 0	ND	NA	NA	ND	ND
M07A-09	11/20/94	2 5	CL	0 0	ND	NA	NA	TPHC AS MOTOR OIL: 37000J(h)	ND
M07A-09	11/20/94	5 0	CL	0 0	ND	NA	NA	ND	ND
M07A-09 DUP	11/20/94	5 0	CL	0 0	ND	NA	NA	TPHC AS MOTOR OIL: 72000J(h)	ND
S07A-01	07/22/94	0 0	--	--	NA	NA	ND	NA	NA
S07A-02	07/22/94	0 0	--	--	NA	NA	ND	NA	NA
S07A-02 DUP	07/22/94	0 0	--	--	NA	NA	ND	NA	NA

* Sample depth indicated represents the top of an 18-inch sample interval.

** USCS Interpretation (for soil borings only):

GW = well-graded gravel	SW = well-graded sand	ML = inorganic silt and very fine sands	MH = inorganic silts, micaceous or diatomaceous fine sand or silty soils
GP = poorly-graded gravel	SP = poorly-graded sand	CL = inorganic clay, low-med plasticity	CH = inorganic clay, high plasticity
GM = silty gravel	SM = silty sand	OL = organic silts and organic silty clays	OH = organic silt/clay, med - high plasticity
GC = clayey gravel	SC = clayey sand		PT = peat

*** Field screening results were obtained using a photoionization detector calibrated using a 100 ppm/v isobutylene standard gas (for soil borings only).

Analytical Data Comments:	ug/kg = Micrograms per kilogram	ND = Analytes reported below detection limits
	ug/L = Micrograms per liter	NA = Not Analyzed
	J = Value estimated at reported concentration	ppm/v = Parts per million volume
		PCBs = Polychlorinated Biphenyls

Analytical QA/QC Comments:	(a) - Surrogate recovery problem	(e) - Internal standards problems
	(b) - Blank contamination problems	(f) - Calibration problems
	(c) - Matrix spike recovery problems	(g) - Quantification below reporting limit
	(d) - Duplicate (precision) problems	(h) - Other problems, refer to data validation narrative

"-" = Not Applicable

TABLE 10-3

**METAL RESULTS IN SOIL EXCEEDING TEN TIMES THE STLC
FROM SITE 7A
CTO 280
ALAMEDA NAVAL AIR STATION**

Sample Location and Depth	Sample Date	Metal	Detected Concentration (mg/kg)	STLC x 10 (mg/kg) ^(a)
B07A-10-0	08/17/94	BARJUM	1120 J	1000.00
	08/17/94	CADMIUM	33.4 J	10.00
	08/17/94	COPPER	1170 J	250.00
	08/17/94	LEAD	2180	50.00
B07A-12-0	08/17/94	BERYLLIUM	8.7 J	7.50
B07A-12-7	08/17/94	LEAD	223	50.00
M07A-08-0	11/20/94	LEAD	50.8	50.00
M07A-09-0	11/20/94	LEAD	101	50.00

Note: ^(a) For the purpose of a screening criteria for this document, soil concentrations have been compared to a value equal to 10 times the STLC.

J - Estimated Concentration

STLC - Solubility Threshold Limit Concentration

SUMMARY OF GROUNDWATER ORGANIC CHEMICAL ANALYSES AND TDS FROM SITE 7A
CTO 280
ALAMEDA NAVAL AIR STATION

WELL NO.	WATER BEARING ZONE	SAMPLE DATE	VOLATILE ORGANIC COMPOUNDS (ug/L)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/L)	PESTICIDES, PCB'S AND DIOXINS (ug/L)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/L)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/L)	TOTAL DISSOLVED SOLIDS (mg/L)
D07A-01	2	12/20/94	ETHYLBENZENE 140J(f) TOLUENE 160 XYLENE (TOTAL) 1400	2,4-DIMETHYLPHENOL 210 2-METHYLNAPHTHALENE 22 NAPHTHALENE 55	ND	TPHC AS JP5 2000J(h)	TPHC AS UNLEADED GASOLINE 4700J(h)	17000
D07A-02	2	12/19/94	ND	ND	ND	ND	ND	18000
D07A-03	2	12/19/94	ND	ND	ND	ND	ND	17000
M07A-01	1	10/14/94	1,1,1-TRICHLOROETHANE 2 1,1-DICHLOROETHANE 1 TRICHLOROETHENE 2	ND	ND	TPHC AS MOTOR OIL 1300J(h)	ND	12900
M07A-01 DUP	1	10/14/94	1,1,1-TRICHLOROETHANE 3 TRICHLOROETHENE 2	ND	ND	TPHC AS MOTOR OIL 1180J(h)	ND	12900
M07A-02	1	10/19/94	CARBON DISULFIDE 2J(f)	ND	ND	TPHC AS MOTOR OIL 790J(h)	ND	27900
M07A-03	1	10/19/94	ND	ND	ND	TPHC AS MOTOR OIL 1100J(h)	ND	27300
M07A-04	1	10/20/94	1,1-DICHLOROETHANE 1 ETHYLBENZENE 6	ND	ND	ND	ND	586
M07A-05	1	10/21/94	CARBON DISULFIDE 3 XYLENE (TOTAL) 4	4-METHYLPHENOL 19	ND	TPHC AS MOTOR OIL 1080J(h)	TPHC AS UNLEADED GASOLINE 53J(h)	33500
M07A-06	1	12/05/94	ND	ND	ND	TPHC AS MOTOR OIL 800J(h)	ND	9900
M07A-07	1	12/07/94	BENZENE 2 XYLENE (TOTAL) 2	ND	ND	TPHC AS MOTOR OIL 2100J(h)	ND	25000
M07A-08	1	12/05/94	ND	ND	ND	ND	ND	3800
M07A-09	1	12/05/94	ND	ND	ND	ND	ND	4600
W-1	1	10/20/94	BENZENE 180 ETHYLBENZENE 150 TOLUENE 160 XYLENE (TOTAL) 960	ND	ND	TPHC AS DIESEL 4490J(h)	TPHC AS UNLEADED GASOLINE 7600J(h)	2360

SUMMARY OF GROUNDWATER ORGANIC CHEMICAL ANALYSES AND TDS FROM SITE 7A

CTO 280
ALAMEDA NAVAL AIR STATION

(Continued)

WELL NO.	WATER BEARING ZONE	SAMPLE DATE	VOLATILE ORGANIC COMPOUNDS (ug/L)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/L)	PESTICIDES, PCB'S AND DIOXINS (ug/L)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/L)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/L)	TOTAL DISSOLVED SOLIDS (mg/L)
W-2	1	10/20/94	BENZENE 2 ETHYLBENZENE 24 TOLUENE 6 XYLENE (TOTAL) 150	ND	ND	TPHC AS DIESEL: 2770J(h)	TPHC AS UNLEADED GASOLINE: 2510J(h)	2750
W-3	1	10/20/94	BENZENE 25 ETHYLBENZENE 14 XYLENE (TOTAL) 11	NAPHTHALENE 490	ND	TPHC AS DIESEL: 4240J(h)	TPHC AS UNLEADED GASOLINE: 1620J(h)	8490
DHP-S07A-01**	2	07/22/94	ND	NA	ND	TPHC AS MOTOR OIL: 3200J(h)	ND	19600
DHP-S07A-02**	2	07/19/94	2-BUTANONE 39J(f) BENZENE 1 CARBON DISULFIDE 1 ETHYLBENZENE 6 TOLUENE 6 XYLENE (TOTAL) 39	NA	ND	TPHC AS MOTOR OIL: 1840J(h)	TPHC AS UNLEADED GASOLINE: 290	16700
DHP-S07A-03**	2	07/20/94	ND	NA	ND	TPHC AS MOTOR OIL: 1700J(h)	ND	33000
DHP-S07A-04**	2	07/19/94	CARBON DISULFIDE 4 XYLENE (TOTAL) 1	NA	ND	TPHC AS MOTOR OIL: 7020J(h)	ND	23600
SHP-S07A-05*	1	07/26/94	CARBON DISULFIDE 4	NA	NA	TPHC AS MOTOR OIL: 1230J(f,h)	ND	NA
DHP-S07A-05**	1	07/26/94	CARBON DISULFIDE 19	NA	NA	ND	ND	NA
SHP-S07A-06*	1	07/20/94	CARBON DISULFIDE 1	NA	ND	NA	ND	NA
SHP-S07A-07*	1	07/25/94	ND	NA	NA	TPHC AS MOTOR OIL: 6770J(f,h)	ND	NA
DHP-S07A-07**	1	07/21/94	CARBON DISULFIDE 79	NA	NA	TPHC AS MOTOR OIL: 5830J(h)	ND	NA
SHP-S07A-08*	1	07/25/94	CHLOROBENZENE 4	NA	NA	ND	ND	NA
SHP-S07A-09*	1	07/26/94	BENZENE 2 XYLENE (TOTAL) 1	NA	NA	TPHC AS MOTOR OIL: 4080J(f,h)	TPHC AS UNLEADED GASOLINE: 54J(h)	NA

SUMMARY OF GROUNDWATER ORGANIC CHEMICAL ANALYSES AND TDS FROM SITE 7A

CTO 280
ALAMEDA NAVAL AIR STATION

(Continued)

WELL NO.	WATER BEARING ZONE	SAMPLE DATE	VOLATILE ORGANIC COMPOUNDS (ug/L)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/L)	PESTICIDES, PCB'S AND DIOXINS (ug/L)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/L)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/L)	TOTAL DISSOLVED SOLIDS (mg/L)
DHP-S07A-09**	1	07/26/94	BENZENE 2 CARBON DISULFIDE 8	NA	NA	TPHC AS DIESEL 7890J(h)	TPHC AS UNLEADED GASOLINE 56J(h)	NA
SHP-S07A-10*	1	07/22/94	BENZENE 200 ETHYLBENZENE 420 TOLUENE 47 XYLENE (TOTAL) 3500	NA	NA	TPHC AS DIESEL 2510J(a,h)	TPHC AS UNLEADED GASOLINE 16900	NA
SHP-S07A-11*	1	07/25/94	BENZENE 22 CARBON DISULFIDE 15 CHLOROFORM 1 ETHYLBENZENE 9 XYLENE (TOTAL) 5	NA	NA	ND	TPHC AS UNLEADED GASOLINE 120J(h)	NA
DHP-S07A-11**	1	07/21/94	2-BUTANONE 64J(f) ACETONE 25J(f) BENZENE 1 CARBON DISULFIDE 9 ETHYLBENZENE 2 XYLENE (TOTAL) 12	NA	NA	NA	TPHC AS UNLEADED GASOLINE 160J(h)	NA
DHP-S07A-03	2	07/20/94	ND	NA	ND	TPHC AS MOTOR OIL 2830J(h)	ND	26100

Analytical Data Comments:

ug/kg = Micrograms per kilogram

ug/L = Micrograms per liter

J = Value estimated at reported concentration

SHP = "Shallow" HydroPunch obtained from first water-bearing zone.

DHP = "Deep" HydroPunch obtained from second water-bearing zone.

ND = Analytes reported below detection limits

NA = Not Analyzed

ppm/v = Parts per million volume

PCBs = Polychlorinated Biphenyls

Analytical QA/QC Comments:

(a) - Surrogate recovery problem

(b) - Blank contamination problems

(c) - Matrix spike recovery problems

(d) - Duplicate (precision) problems

(e) - Internal standards problems

(f) - Calibration problems

(g) - Quantification below reporting limit

(h) - Other problems, refer to data validation narrative

TABLE 10-5

**METAL RESULTS IN GROUNDWATER EXCEEDING 95 PERCENT/95 PERCENT STI
FROM SITE 7A
CTO 280
ALAMEDA NAVAL AIR STATION**

Sample Location	Sample Date	Metal	Detected Concentration (ug/L)	Upper Tolerance Limit (ug/L) ^(a)
M07A-01	10/14/94	SELENIUM	6.1 J	1.0
M07A-02	10/19/94	ARSENIC	94.0	36.3
M07A-03	10/19/94	ARSENIC	60.7	36.3
	10/19/94	CHROMIUM	19.2 J	3.2
M07A-04	10/20/94	THALLIUM	4.3 J	0.9
M07A-06	12/05/94	BERYLLIUM	1.6 J	1.3
	12/05/94	NICKEL	18.2 J	6.6
M07A-07	12/07/94	BERYLLIUM	1.5 J	1.3
	12/07/94	COBALT	8.9 J	8.6
	12/07/94	NICKEL	28.3 J	6.6
	12/07/94	SELENIUM	3.1 J	1.0
M07A-08	12/05/94	BERYLLIUM	1.7 J	1.3
	12/05/94	NICKEL	12.6 J	6.6
M07A-09	12/05/94	NICKEL	10.6 J	6.6
W-1	10/20/94	ARSENIC	45.1	36.3
W-2	10/20/94	ARSENIC	57.5	36.3
	10/20/94	BERYLLIUM	1.7 J	1.3
W-3	10/20/94	ARSENIC	173	36.3

Note: ^(a) This value represents the upper tolerance interval of the 95 percent/95 percent STI (95/95 STI). The 95/95 STI is the value below which 95 percent of the groundwater samples are expected to fall 95 percent of the time, based on previous groundwater samples collected from NAS Alameda from areas of non-industrial use.

J - Estimated concentration

STI - Statistical Tolerance Interval

SUMMARY OF NON POINT SOURCE ORGANIC CHEMICAL ANALYSES FROM SITE 7A
CTO 280
ALAMEDA NAVAL AIR STATION

NPS I.D.	SAMPLE DATE	VOLATILE ORGANIC COMPOUNDS (ug/kg)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/kg)	PESTICIDES, PCB'S AND DIOXINS (ug/kg)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/kg)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/kg)
NPS-S07A-02	08/24/94	ND	ND	NA	TPHC AS MOTOR OIL: 1140000J(h)	TPHC AS UNLEADED GASOLINE 3500J(a,h)
NPS-S07A-03	07/19/94	ND	ND	NA	TPHC AS MOTOR OIL: 910000J(h)	ND

Analytical Data Comments: ug/kg = Micrograms per kilogram
 ug/L = Micrograms per liter
 J = Value estimated at reported concentration

ND = Analytes reported below detection limits
 NA = Not Analyzed
 ppm/v = Parts per million volume
 PCBs = Polychlorinated Biphenyls

Analytical QA/QC Comments: (a) - Surrogate recovery problem
 (b) - Blank contamination problems
 (c) - Matrix spike recovery problems
 (d) - Duplicate (precision) problems
 (e) - Internal standards problems
 (f) - Calibration problems
 (g) - Quantification below reporting limit
 (h) - Other problems, refer to data validation narrative

SUMMARY OF QUALITY CONTROL ORGANIC CHEMICAL ANALYSES FROM SITE 7A
CTO 280
ALAMEDA NAVAL AIR STATION

WELL NO.	SAMPLE DATE	VOLATILE ORGANIC COMPOUNDS (ug/L)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/L)	PESTICIDES, PCB'S AND DIOXINS (ug/L)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/L)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/L)
S07A-ER-01	07/19/94	ND	ND	ND	TPHC AS JP5 150	ND
S07A-ER-02	11/20/94	ND	NA	NA	ND	ND
S07A-ER-02	07/19/94	ND	NA	ND	ND	ND
S07A-ER-03	07/20/94	ND	NA	ND	ND	ND
S07A-ER-04	07/22/94	NA	NA	ND	NA	NA
S07A-ER-05	07/22/94	ND	NA	ND	TPHC AS DIESEL 420J(h)	ND
S07A-ER-06	07/26/94	ND	NA	NA	ND	ND
S07A-ER-07	07/26/94	ND	NA	NA	ND	ND
S07A-TB	11/20/94	1,2-DICHLOROETHANE 0.8	NA	NA	NA	NA
S07A-TB	10/19/94	1,2-DICHLOROETHANE 1	NA	NA	NA	NA
S07A-TB-01	07/19/94	ND	NA	NA	NA	NA
S07A-TB-02	07/19/94	ND	NA	NA	NA	NA
S07A-TB-03	07/20/94	ND	NA	NA	NA	NA
S07A-TB-04	07/20/94	ND	NA	NA	NA	NA
S07A-TB-05	07/22/94	ND	NA	NA	NA	NA
S07A-TB-06	07/25/94	1,2-DICHLOROETHANE 0.6	NA	NA	NA	NA
S07A-TB-07	07/26/94	ND	NA	NA	NA	NA
S07A-TB-08	08/17/94	BENZENE 0.9 TOLUENE 7 XYLENE (TOTAL) 3	NA	NA	NA	NA

SUMMARY OF QUALITY CONTROL ORGANIC CHEMICAL ANALYSES FROM SITE 7A

CTO 280

ALAMEDA NAVAL AIR STATION

(Continued)

WELL NO.	SAMPLE DATE	VOLATILE ORGANIC COMPOUNDS (ug/L)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/L)	PESTICIDES, PCB'S AND DIOXINS (ug/L)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/L)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/L)
S07A-TB-09	08/17/94	ND	NA	NA	NA	NA
TB	10/20/94	1,2-DICHLOROETHANE 0.6	NA	NA	NA	NA
TB	10/14/94	1,2-DICHLOROETHANE 1	NA	NA	NA	NA

Analytical Data Comments: ug/kg = Micrograms per kilogram

ug/L = Micrograms per liter

J = Value estimated at reported concentration

TB = Trip Blank

ER = Equipment Rinsate

ND = Analytes reported below detection limits

NA = Not Analyzed

ppm/v = Parts per million volume

PCBs = Polychlorinated Biphenyls

Analytical QA/QC Comments:

- (a) - Surrogate recovery problem
- (b) - Blank contamination problems
- (c) - Matrix spike recovery problems
- (d) - Duplicate (precision) problems

- (e) - Internal standards problems
- (f) - Calibration problems
- (g) - Quantification below reporting limit
- (h) - Other problems, refer to data validation narrative

TABLE 11-1

SUMMARY OF FIELD WORK FOR SITE 7B AND 11
CTO 280
ALAMEDA NAVAL AIR STATION

Cone Penetrometer Testing	Deep HydroPunch	Soil Sampling	Shallow Wells	Deep Wells	Groundwater Sampling	Non-Point Source Sampling	Geophysical Survey
CPT-S07B-01	DHP-S07B-01	B07B-04	M11-05	D11-01	M07B-01	NPS-S07B-01	X
CPT-S07B-02	DHP-S07B-02	B07B-05	M11-06		M11-01	NPS-S07B-02	
CPT-S11-01	DHP-S11-01	B11-08			M11-02	NPS-S11-01	
CPT-S11-02	DHP-S11-02	B11-09			M11-03		
		B11-10			M11-04		
		B11-11			M11-05		
		B11-12			M11-06		
		B11-13			D11-01		
		B11-14			WA-08		
		M11-05					
		M11-06					

**SUMMARY OF SOIL ORGANIC CHEMICAL ANALYSES FROM SITES 7B AND 11
CTO 280
ALAMEDA NAVAL AIR STATION**

WELL NO.	SAMPLE DATE	SAMPLE DEPTH (feet bgs)	USCS CLASSIFICATION **	FIELD SCREEN (ppmv) ***	VOLATILE ORGANIC COMPOUNDS (ug/kg)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/kg)	PESTICIDES, PCB'S AND DIOXINS (ug/kg)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/kg)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/kg)
B11-08	08/16/94	0 0	SP	0 0	NA	NA	NA	ND	ND
B11-08	08/16/94	2 5	SP	0 0	ND	NA	NA	TPHC AS MOTOR OIL 30000J(h)	ND
B11-08	08/16/94	5 0	SP	0 0	ND	NA	NA	ND	ND
B11-09	08/16/94	0 0	SW	0 0	NA	NA	NA	TPHC AS MOTOR OIL 180000J(h)	ND
B11-09	08/16/94	2 5	SW	0 0	ND	NA	NA	TPHC AS MOTOR OIL 150000J(h)	ND
B11-09	08/16/94	5 0	SP	0 0	ND	NA	NA	ND	ND
B11-09 DUP	08/16/94	5 0	SP	0 0	ND	NA	NA	ND	ND
B11-10	08/12/94	0 0	SP	0 5	NA	NA	NA	TPHC AS MOTOR OIL 78000J(h)	ND
B11-10	08/12/94	2 5	SP	0 5	ND	NA	NA	TPHC AS MOTOR OIL 28000J(h)	ND
B11-10	08/12/94	5 0	SP	0 5	ND	NA	NA	TPHC AS MOTOR OIL 31000J(h)	ND
B11-11	08/16/94	0 0	SW	0 0	NA	NA	NA	ND	ND
B11-11	08/16/94	2 5	SP	0 0	ND	NA	NA	TPHC AS MOTOR OIL 170000J(h)	ND

SUMMARY OF SOIL ORGANIC CHEMICAL ANALYSES FROM SITES 7B AND 11
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

WELL NO.	SAMPLE DATE	SAMPLE DEPTH (feet bgs)	USCS CLASSIFICATION	FIELD SCREEN (ppm/v)	VOLATILE ORGANIC COMPOUNDS (ug/kg)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/kg)	PESTICIDES, PCB'S AND DIOXINS (ug/kg)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/kg)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/kg)
B11-11	08/16/94	5.0	SP	0.0	ND	NA	NA	ND	ND
B11-12	08/16/94	0.0	SW	11	NA	NA	NA	TPHC AS MOTOR OIL 326000J(h)	ND
B11-12	08/16/94	2.5	SW	11	ND	NA	NA	ND	ND
B11-12	08/16/94	5.0	SP	0.0	ND	NA	NA	ND	ND
B11-13	08/16/94	0.0	SW	0.0	NA	NA	NA	ND	ND
B11-13	08/16/94	2.5	SW	0.0	ND	NA	NA	ND	ND
B11-13	08/16/94	5.0	SP	0.0	ND	NA	NA	ND	ND
B11-14	08/16/94	0.0	SW	0.0	NA	NA	NA	TPHC AS MOTOR OIL 25000J(h)	ND
B11-14	08/16/94	2.5	SP	1.9	ND	NA	NA	ND	ND
B11-14	08/16/94	5.0	SP	1.9	ND	NA	NA	ND	ND
B07B-04	08/16/94	0.0	SP		NA	ND	4,4'-DDT 58J(h)	TPHC AS MOTOR OIL 170000J(h)	ND
B07B-04	08/16/94	2.5	SP		ND	ND	ND	ND	ND

SUMMARY OF SOIL ORGANIC CHEMICAL ANALYSES FROM SITES 7B AND 11
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

WELL NO.	SAMPLE DATE	SAMPLE DEPTH (feet bgs)	USCS CLASSIFICATION	FIELD SCREEN (ppmv)	VOLATILE ORGANIC COMPOUNDS (ug/kg)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/kg)	PESTICIDES, PCB'S AND DIOXINS (ug/kg)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/kg)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/kg)
B07B-04	08/16/94	5 0	SP		ND	ND	ND	ND	TPHC AS UNLEADED GASOLINE 16000J(h)
B7B-05	08/16/94	0 0	SP	0 0	NA	ND	ND	TPHC AS MOTOR OIL 22000J(h)	ND
B7B-05	08/16/94	2 5	SP	0 0	ND	ND	ND	ND	ND
B7B-05	08/16/94	5 0	SP	0 0	ND	ND	ND	ND	ND
B7B-05 DUP	08/16/94	5 0	SP	0 0	ND	ND	ND	TPHC AS MOTOR OIL 26000J(h)	ND
M11-05	08/16/94	0 0	SW	0 0	NA	ND	NA	ND	ND
M11-05	08/16/94	2 5	SW	0 0	ND	ND	NA	ND	ND
M11-05	08/16/94	5 0	SP	0 0	ND	ND	NA	ND	ND
M11-06	08/16/94	0 0	SP	0 0	NA	ND	NA	TPHC AS MOTOR OIL 44000J(f,h)	ND
M11-06	08/16/94	2 5	SP	0 0	ND	ND	NA	ND	ND
M11-06	08/16/94	5 0	SP	0 0	ND	ND	NA	ND	ND

• Sample data reported represents the top of an 18-inch sample interval.

** USCS Interpretation (for soil borings only):

GW = well-graded gravel	SW = well-graded sand	ML = inorganic silt and very fine sands	MH = inorganic silts, micaceous or diatomaceous fine sand or silty soils
GP = poorly-graded gravel	SP = poorly-graded sand	CL = inorganic clay, low-med plasticity	CH = inorganic clay, high plasticity
GM = silty gravel	SM = silty sand	OL = organic silts and organic silty clays	OH = organic silt/clay, med - high plasticity
GC = clayey gravel	SC = clayey sand		PT = peat

*** Field screening results were obtained using a photoionization detector calibrated using a 100 ppm/v isobutylene standard gas (for soil borings only).

Analytical Data Comments:	ug/kg = Micrograms per kilogram	ND = Analytes reported below detection limits
	ug/L = Micrograms per liter	NA = Not Analyzed
	J = Value estimated at reported concentration	ppm/v = Parts per million volume
		PCBs = Polychlorinated Biphenyls

Analytical QA/QC Comments:	(a) - Surrogate recovery problem	(e) - Internal standards problems
	(b) - Blank contamination problems	(f) - Calibration problems
	(c) - Matrix spike recovery problems	(g) - Quantification below reporting limit
	(d) - Duplicate (precision) problems	(h) - Other problems, refer to data validation narrative

"--" = Not Applicable

TABLE 11-3

**METAL RESULTS IN SOIL EXCEEDING TEN TIMES THE STLC
FROM SITES 7B AND 11
CTO 280
ALAMEDA NAVAL AIR STATION**

Sample Location and Depth	Sample Date	Metal	Detected Concentration (mg/kg)	STLC x 10 (mg/kg) ^(a)
B11-09-2.5	08/16/94	LEAD	64.8	50.00
B11-12-0	08/16/94	LEAD	74.2	50.00
B07B-04-0	08/16/94	LEAD	416	50.00
	08/16/94	MERCURY	2.6	2.00

Note: ^(a) For the purpose of a screening criteria for this document, soil concentrations have been compared to a value equal to 10 times the STLC.

J - Estimated Concentration

STLC - Solubility Threshold Limit Concentration

SUMMARY OF GROUNDWATER ORGANIC CHEMICAL ANALYSES AND TDS FROM SITES 7B AND 11
CTO 280
ALAMEDA NAVAL AIR STATION

WELL NO.	WATER BEARING ZONE	SAMPLE DATE	VOLATILE ORGANIC COMPOUNDS (ug/L)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/L)	PESTICIDES, PCB'S AND DIOXINS (ug/L)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/L)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/L)	TOTAL DISSOLVED SOLIDS (mg/L)
M07B-01	1	11/01/94	1,1,1-TRICHLOROETHANE: 6 1,2-DICHLOROETHENE (TOTAL) 6 VINYL CHLORIDE 07	ND	ND	TPHC AS MOTOR OIL: 370J(h)	ND	1420
M11-01	1	10/26/94	1,1,1-TRICHLOROETHANE: 7 1,1-DICHLOROETHANE: 3 BENZENE 2 TRICHLOROETHENE: 2 XYLENE (TOTAL) 1	ND	ND	TPHC AS DIESEL: 980J(h)	TPHC AS UNLEADED GASOLINE: 78J(h)	1300 J(h)
M11-02	1	10/26/94	1,1-DICHLOROETHANE: 2 1,2-DICHLOROETHENE (TOTAL) 1 VINYL CHLORIDE 09	ND	ND	TPHC AS MOTOR OIL: 1800J(h)	ND	1300 J(h)
M11-03	1	11/01/94	ND	ND	ND	TPHC AS MOTOR OIL: 1170J(h)	ND	862
M11-04	1	11/04/94	ND	ND	ND	ND	ND	684
M11-05	1	10/26/94	ND	ND	ND	TPHC AS MOTOR OIL: 1910J(h)	ND	7600
M11-05 DUP	1	10/26/94	ND	ND	ND	TPHC AS MOTOR OIL: 1430J(h)	ND	7700 J(h)
M11-08	1	11/29/94	1,1-DICHLOROETHANE 1 1,2-DICHLOROETHENE (TOTAL) 20 TRICHLOROETHENE 23 VINYL CHLORIDE 6	ND	ND	ND	ND	700
DHP-S07B-01	2	08/04/94	ND	NA	NA	TPHC AS MOTOR OIL: 520J(h)	ND	44500
DHP-S07B-02	2	08/04/94	ND	NA	NA	TPHC AS MOTOR OIL: 1000J(h)	ND	36300
DHP-S07B-02	2	08/04/94	ND	NA	NA	TPHC AS MOTOR OIL: 850J(h)	ND	35300
DHP-S11-01	2	08/03/94	ND	NA	NA	TPHC AS MOTOR OIL: 1820J(h)	ND	2070
DHP-S11-02	2	08/03/94	1,1-DICHLOROETHENE 1 1,2-DICHLOROETHENE (TOTAL) 20 TRICHLOROETHENE 36 VINYL CHLORIDE 06	NA	NA	TPHC AS MOTOR OIL: 1220J(h)	ND	2530

Analytical Data

Comments: ug/kg = Micrograms per kilogram

ug/L = Micrograms per liter

J = Value estimated at reported concentration

SHP = "Shallow" HydroPunch obtained from first water-bearing zone.

DHP = "Deep" HydroPunch obtained from second water-bearing zone.

ND = Analytes reported below detection limits

NA = Not Analyzed

ppm/v = Parts per million volume

PCBs = Polychlorinated Biphenyls

Analytical QA/QC Comments:

(a) - Surrogate recovery problem

(b) - Blank contamination problems

(c) - Matrix spike recovery problems

(d) - Duplicate (precision) problems

(e) - Internal standards problems

(f) - Calibration problems

(g) - Quantification below reporting limit

(h) - Other problems, refer to data validation narrative

TABLE 11-5

**METAL RESULTS IN GROUNDWATER EXCEEDING 95 PERCENT/95 PERCENT STI
FROM SITES 7B AND 11
CTO 280
ALAMEDA NAVAL AIR STATION**

Sample Location	Sample Date	Metal	Detected Concentration (ug/L)	Upper Tolerance Limit (ug/L) ^(a)
M11-01	10/26/94	CHROMIUM	5.5 J	3.2
M11-02	10/26/94	NICKEL	11.8 J	6.6
M11-04	11/04/94	BERYLLIUM	1.4 J	1.3
M11-05 Dup	10/26/94	NICKEL	16.9 J	6.6

Note: ^(a) This value represents the upper tolerance interval of the 95 percent/95 percent STI (95/95 STI). The 95/95 STI is the value below which 95 percent of the groundwater samples are expected to fall 95 percent of the time, based on previous groundwater samples collected from NAS Alameda from areas of non-industrial use.

J - Estimated concentration

STI - Statistical Tolerance Interval

SUMMARY OF NON POINT SOURCE ORGANIC CHEMICAL ANALYSES FROM SITES 7B AND 11
CTO 280
ALAMEDA NAVAL AIR STATION

NPS I.D.	SAMPLE DATE	VOLATILE ORGANIC COMPOUNDS (ug/kg)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/kg)	PESTICIDES, PCB'S AND DIOXINS (ug/kg)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/kg)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/kg)
NPS-S11-01	07/18/94	ND	BIS(2-ETHYLHEXYL)PHTHALATE: 160000J(h) FLUORANTHENE: 12000J(g)	NA	TPHC AS DIESEL: 1970000J(a,h)	TPHC AS UNLEADED GASOLINE: 3330000J(h)
NPS-S7B-01	07/18/94	ND	ND	NA	TPHC AS MOTOR OIL: 1940000J(f,h)	ND
NPS-S7B-02	08/24/94	ND	ND	NA	TPHC AS MOTOR OIL: 220000J(h)	ND
NPS-S7B-02Dup	08/24/94	ND	BENZO(A)ANTHRACENE: 400 FLUORANTHENE: 830 PYRENE: 600	NA	TPHC AS MOTOR OIL: 240000J(h)	ND

Analytical Data Comments: ug/kg = Micrograms per kilogram

ug/L = Micrograms per liter

J = Value estimated at reported concentration

ND = Analytes reported below detection limits

NA = Not Analyzed

ppm/v = Parts per million volume

PCBs = Polychlorinated Biphenyls

Analytical QA/QC Comments: (a) - Surrogate recovery problem

(b) - Blank contamination problems

(c) - Matrix spike recovery problems

(d) - Duplicate (precision) problems

(e) - Internal standards problems

(f) - Calibration problems

(g) - Quantification below reporting limit

(h) - Other problems, refer to data validation narrative

SUMMARY OF QUALITY CONTROL ORGANIC CHEMICAL ANALYSES FROM SITES 7B AND 11
CTO 280
ALAMEDA NAVAL AIR STATION

WELL NO.	SAMPLE DATE	VOLATILE ORGANIC COMPOUNDS (ug/L)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/L)	PESTICIDES, PCB'S AND DIOXINS (ug/L)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/L)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/L)
S7B11-ER-01	08/03/94	ND	NA	NA	ND	ND
S7B11-ER-02	08/04/94	ND	NA	NA	ND	ND
S7B11-ER-03	08/16/94	ND	NA	NA	ND	ND
S7B11-ER-04	08/11/94	1,2-DICHLOROETHANE 0.7	ND	NA	NA	NA
S7B11-TB-01	08/03/94	ND	NA	NA	NA	NA
S7B11-TB-02	08/16/94	ND	NA	NA	NA	NA
S7B11-TB-03	08/16/94	ND	NA	NA	NA	NA
S7B11-TB-04	08/16/94	ND	NA	NA	NA	NA

Analytical Data Comments: ug/kg = Micrograms per kilogram

ug/L = Micrograms per liter

J = Value estimated at reported concentration

TB = Trip Blank

ER = Equipment Rinsate

ND = Analytes reported below detection limits

NA = Not Analyzed

ppm/v = Parts per million volume

PCBs = Polychlorinated Biphenyls

Analytical QA/QC Comments:

- (a) - Surrogate recovery problem
- (b) - Blank contamination problems
- (c) - Matrix spike recovery problems
- (d) - Duplicate (precision) problems

- (e) - Internal standards problems
- (f) - Calibration problems
- (g) - Quantification below reporting limit
- (h) - Other problems, refer to data validation narrative

TABLE 12-1

**SUMMARY OF FIELD WORK FOR SITE 7C
CTO 280
ALAMEDA NAVAL AIR STATION**

Cone Penetrometer Testing	Deep HydroPunch	Soil Sampling	Shallow Wells	Deep Wells	Groundwater Sampling	Non-Point Source Sampling	Geophysical Survey
CPT-S07C-01	DHP-S07C-01	B07C-11	M07C-06	D7C-01	MW547-1	NPS-S07C-01	X
CPT-S07C-02	DHP-S07C-02	B07C-12	M07C-07		MW547-2		
CPT-S07C-03	DHP-S07C-03	B07C-13	M07C-08		MW547-3		
CPT-S07C-04	DHP-S07C-04	B07C-14	M07C-09		MW547-4		
		B07C-15			MW547-5		
		M07C-06			M07C-06		
		M07C-07			M07C-07		
		M07C-08			M07C-08		
		M07C-09			M07C-09		
					D07C-01		

**SUMMARY OF SOIL ORGANIC CHEMICAL ANALYSES FROM SITE 7C
CTO 280
ALAMEDA NAVAL AIR STATION**

WELL NO.	SAMPLE DATE	SAMPLE DEPTH (feet bgs)	USCS CLASSIFICATION	FIELD SCREEN (ppmv)	VOLATILE ORGANIC COMPOUNDS (ug/kg)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/kg)	PESTICIDES, PCB'S AND DIOXINS (ug/kg)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/kg)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/kg)
B7C-11	08/17/94	0 0	SP	2 5	ND	ND	NA	ND	ND
B7C-11	08/17/94	2 5	SP	2 5	ND	ND	NA	ND	ND
B7C-11	08/17/94	5 0	SP	2 5	ND	ND	NA	ND	ND
B7C-12	08/17/94	0 0	SM	110-315	ND	ND	NA	ND	ND
B7C-12	08/17/94	2 5	SM	110-315	ETHYLBENZENE: 12 TOLUENE: 20 XYLENE (TOTAL): 70	ND	NA	ND	TPHC AS UNLEADED GASOLINE 1300
B7C-12	08/17/94	5 0	SM	110-315	BENZENE: 3300 ETHYLBENZENE: 28000 TOLUENE: 40000 XYLENE (TOTAL): 160000	2-METHYLNAPHTHALENE: 4400 NAPHTHALENE: 2200	NA	TPHC AS JP5: 220000	TPHC AS UNLEADED GASOLINE 10200000
B7C-13	08/23/94	0 0	SC	20	ND	ND	NA	TPHC AS MOTOR OIL: 60000J(f,h)	ND
B7C-13	08/23/94	2 5	SC	20	ETHYLBENZENE: 82J(a)	NAPHTHALENE: 780	NA	TPHC AS MOTOR OIL: 76000J(f,h)	TPHC AS UNLEADED GASOLINE 26000
B7C-13	08/23/94	5 0	SC	20	ND	2-METHYLNAPHTHALENE: 12000 NAPHTHALENE: 13000 PYRENE: 490	NA	TPHC AS JP5: 540000J(h)	TPHC AS UNLEADED GASOLINE 11700000
B7C-13 DUP	08/23/94	2 5	SC	20	ND	ND	NA	TPHC AS MOTOR OIL: 36000J(f,h)	TPHC AS UNLEADED GASOLINE 1200J(h)

SUMMARY OF SOIL ORGANIC CHEMICAL ANALYSES FROM SITE 7C
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

WELL NO.	SAMPLE DATE	SAMPLE DEPTH (feet bgs)	USCS CLASSIFICATION **	FIELD SCREEN (ppm/v) ***	VOLATILE ORGANIC COMPOUNDS (ug/kg)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/kg)	PESTICIDES, PCB'S AND DIOXINS (ug/kg)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/kg)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/kg)
B7C-14	08/17/94	0 0	SW	0 0	ETHYLBENZENE 120 XYLENE (TOTAL) 640	ND	NA	ND	TPHC AS UNLEADED GASOLINE 12000J(f)
B7C-14	08/17/94	2 5	SW	0 0	ETHYLBENZENE 77 XYLENE (TOTAL) 610	ND	NA	ND	TPHC AS UNLEADED GASOLINE 1800J(f,h)
B7C-14	08/17/94	5 0	SW	0 0	ETHYLBENZENE 570000 TOLUENE 840000 XYLENE (TOTAL) 2600000	2-METHYLNAPHTHALENE 110000J(h) NAPHTHALENE 110000J(h)	NA	TPHC AS JP5: 4590000J(h)	TPHC AS UNLEADED GASOLINE 66900000J(f)
B7C-15	08/17/94	0 0	ML	0 0	ND	ND	NA	TPHC AS MOTOR OIL: 38000J(f,h)	TPHC AS UNLEADED GASOLINE 1300
B7C-15	08/17/94	2 5	ML	0 0	ND	ND	NA	ND	ND
B7C-15	08/17/94	5 0	ML	0 0	ND	ND	NA	TPHC AS MOTOR OIL: 95000J(f,h)	ND
M07C-06	08/17/94	0 0	SM	1 3-4 4	ND	ND	NA	TPHC AS MOTOR OIL: 1470000J(h)	TPHC AS UNLEADED GASOLINE 600J(f)
M07C-06	08/17/94	2 5	SM	1 3-4 4	ND	ND	NA	TPHC AS MOTOR OIL: 990000J(h)	ND
M07C-06	08/17/94	5 0	SM	1 3-4 4	ND	ND	NA	TPHC AS MOTOR OIL: 130000J(h)	ND
M07C-07	08/18/94	0 0	GW	0 0	ND	ND	NA	TPHC AS MOTOR OIL: 3000000J(h)	ND

SUMMARY OF SOIL ORGANIC CHEMICAL ANALYSES FROM SITE 7C
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

WELL NO.	SAMPLE DATE	SAMPLE DEPTH (feet bgs)	USCS CLASSIFICATION **	FIELD SCREEN (ppm/v) ***	VOLATILE ORGANIC COMPOUNDS (ug/kg)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/kg)	PESTICIDES, PCB'S AND DIOXINS (ug/kg)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/kg)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/kg)
M07C-07	08/18/94	2.5	SP	0.0	ND	ND	NA	TPHC AS MOTOR OIL 880000J(h)	ND
M07C-07	08/18/94	5.0	SP	0.0	ND	ND	NA	ND	ND
M07C-08	08/18/94	0.0	ML	0.0	ND	BENZO(A)ANTHRACENE 350 BENZO(A)PYRENE 400 BENZO(B)FLUORANTHENE 520 BENZO(G,H,I)PERYLENE 390 CHRYSENE 350 FLUORANTHENE 970 INDENO(1,2,3-CD)PYRENE 420 PHENANTHRENE 590 PYRENE 960	NA	TPHC AS MOTOR OIL 38000J(h)	ND
M07C-08	08/18/94	2.5	SP	0.0	ND	ND	NA	TPHC AS MOTOR OIL 120000J(h)	ND
M07C-08	08/18/94	5.0	ML	0.0	ND	ND	NA	ND	ND
M07C-08 DUP	08/18/94	5.0	SP	0.0	ND	ND	NA	ND	ND
M07C-09	08/17/94	0.0	SP	0-1.3	ND	ND	NA	TPHC AS MOTOR OIL 310000J(h)	ND
M07C-09	08/17/94	2.5	SP	0-1.3	ACETONE 150J(f)	ND	NA	TPHC AS MOTOR OIL 110000J(h)	ND
M07C-09	08/17/94	5.0	SP	0-1.3	ND	ND	NA	ND	ND

* Sample designated as "T" represents the top of an 18-inch sample interval.

** USCS Interpretation (for soil borings only):

GW = well-graded gravel	SW = well-graded sand	ML = inorganic silt and very fine sands	MH = inorganic silts, micaceous or diatomaceous fine sand or silty soils
GP = poorly-graded gravel	SP = poorly-graded sand	CL = inorganic clay, low-med plasticity	CH = inorganic clay, high plasticity
GM = silty gravel	SM = silty sand	OL = organic silts and organic silty clays	OH = organic silt/clay, med - high plasticity
GC = clayey gravel	SC = clayey sand		PT = peat

*** Field screening results were obtained using a photoionization detector calibrated using a 100 ppm/v isobutylene standard gas (for soil borings only).

Analytical Data Comments:	ug/kg = Micrograms per kilogram	ND = Analytes reported below detection limits
	ug/L = Micrograms per liter	NA = Not Analyzed
	J = Value estimated at reported concentration	ppm/v = Parts per million volume
		PCBs = Polychlorinated Biphenyls

Analytical QA/QC Comments:	(a) - Surrogate recovery problem	(e) - Internal standards problems
	(b) - Blank contamination problems	(f) - Calibration problems
	(c) - Matrix spike recovery problems	(g) - Quantification below reporting limit
	(d) - Duplicate (precision) problems	(h) - Other problems, refer to data validation narrative

"-" = Not Applicable

TABLE 12-3

**METAL RESULTS IN SOIL EXCEEDING TEN TIMES THE STLC
FROM SITE 7C
CTO 280
ALAMEDA NAVAL AIR STATION**

Sample Location and Depth	Sample Date	Metal	Detected Concentration (mg/kg)	STLC x 10 (mg/kg) ^(a)
B7C-13-0	08/23/94	LEAD	52.2 J	50.00
B7C-15-0	08/17/94	LEAD	61.6 J	50.00
M07C-07-2.5	08/18/94	LEAD	89.9	50.00
M07C-08-2.5	08/18/94	LEAD	67.8	50.00

Note: ^(a) For the purpose of a screening criteria for this document, soil concentrations have been compared to a value equal to 10 times the STLC.

J - Estimated Concentration

STLC - Solubility Threshold Limit Concentration

SUMMARY OF GROUNDWATER ORGANIC CHEMICAL ANALYSES AND TDS FROM SITE 7C
CTO 280
ALAMEDA NAVAL AIR STATION

WELL NO.	WATER BEARING ZONE	SAMPLE DATE	VOLATILE ORGANIC COMPOUNDS (ug/L)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/L)	PESTICIDES, PCB'S AND DIOXINS (ug/L)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/L)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/L)	TOTAL DISSOLVED SOLIDS (mg/L)
D07C-01	2	12/20/94	ND	ND	NA	ND	ND	1600
M07C-06	1	11/10/94	ND	ND	NA	ND	ND	1210
M07C-07	1	11/08/94	ND	ND	NA	TPHC AS MOTOR OIL: 1300J(h)	ND	1570
M07C-08	1	11/07/94	ND	ND	NA	ND	ND	476
M07C-09	1	11/10/94	ND	ND	NA	ND	ND	674
MW547-1	1	11/08/94	BENZENE 2 ETHYLBENZENE 5	ND	NA	TPHC AS DIESEL: 260J(h)	ND	648
MW547-2	1	11/08/94	ND	ND	NA	ND	ND	480
MW547-3	1	11/07/94	BENZENE 400 ETHYLBENZENE 390	2-METHYLNAPHTHALENE: 13 NAPHTHALENE: 54 PHENOL: 36	NA	TPHC AS DIESEL: 770J(h)	TPHC AS UNLEADED GASOLINE: 4190J(h)	822
MW547-4	1	11/07/94	BENZENE 6 ETHYLBENZENE 9	NAPHTHALENE: 34	NA	TPHC AS DIESEL: 600J(h)	TPHC AS UNLEADED GASOLINE: 940J(h)	660
MW547-4 DUP	1	11/07/94	BENZENE 6 ETHYLBENZENE 10	NAPHTHALENE: 36	NA	TPHC AS DIESEL: 670J(a,h)	TPHC AS UNLEADED GASOLINE: 900J(h)	742
MW547-5	1	11/10/94	ND	ND	NA	ND	ND	634
DHP-S07C-01	2	07/28/94	ACETONE 65J(f) ETHYLENE DIBROMIDE NA	ND	NA	TPHC AS MOTOR OIL: 4120J(h)	TPHC AS UNLEADED GASOLINE: 320J(h)	1250
DHP-S07C-02	2	08/02/94	ND	PENTACHLOROPHENOL: 100	NA	TPHC AS MOTOR OIL: 510J(h)	TPHC AS UNLEADED GASOLINE: 580J(h)	520
DHP-S07C-02	2	08/02/94	ND	PENTACHLOROPHENOL: 100	NA	TPHC AS MOTOR OIL: 400J(h)	TPHC AS UNLEADED GASOLINE: 590J(h)	650

SUMMARY OF GROUNDWATER ORGANIC CHEMICAL ANALYSES AND TDS FROM SITE 7C
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

WELL NO.	WATER BEARING ZONE	SAMPLE DATE	VOLATILE ORGANIC COMPOUNDS (ug/L)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/L)	PESTICIDES, PCB'S AND DIOXINS (ug/L)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/L)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/L)	TOTAL DISSOLVED SOLIDS (mg/L)
DHP-S07C-03	2	07/29/94	1,2-DICHLOROETHANE: 10 XYLENE (TOTAL): 6	ND	NA	TPHC AS MOTOR OIL: 8250J(h)	ND	964
DHP-S07C-04	2	08/01/94	ND	ND	NA	TPHC AS MOTOR OIL: 2070J(f,h)	ND	1050

Analytical Data Comments: ug/kg = Micrograms per kilogram

ug/L = Micrograms per liter

J = Value estimated at reported concentration

SHP = "Shallow" HydroPunch obtained from first water-bearing zone.

DHP = "Deep" HydroPunch obtained from second water-bearing zone.

ND = Analytes reported below detection limits

NA = Not Analyzed

ppm/v = Parts per million volume

PCBs = Polychlorinated Biphenyls

Analytical QA/QC Comments:

(a) - Surrogate recovery problem

(b) - Blank contamination problems

(c) - Matrix spike recovery problems

(d) - Duplicate (precision) problems

(e) - Internal standards problems

(f) - Calibration problems

(g) - Quantification below reporting limit

(h) - Other problems, refer to data validation narrative

TABLE 12-5

**METAL RESULTS IN GROUNDWATER EXCEEDING 95 PERCENT/95 PERCENT STI
FROM SITE 7C
CTO 280
ALAMEDA NAVAL AIR STATION**

Sample Location	Sample Date	Metal	Detected Concentration (ug/L)	Upper Tolerance Limit (ug/L) ^(a)
M07C-06	11/10/94	BERYLLIUM	1.4 J	1.3
M07C-07	11/08/94	BERYLLIUM	1.4 J	1.3
	11/08/94	NICKEL	108	6.6
	11/08/94	ZINC	52.5	25.7
M07C-08	11/07/94	BERYLLIUM	1.4 J	1.3
	11/07/94	ZINC	34.0	25.7
M07C-09	11/10/94	MERCURY	0.22 J	0.1
MW547-1	11/08/94	BERYLLIUM	1.4 J	1.3
MW547-2	11/08/94	BERYLLIUM	1.4 J	1.3
MW547-3	11/07/94	BERYLLIUM	1.4 J	1.3
MW547-4 Dup	11/07/94	ZINC	33.8	25.7
MW547-5	11/10/94	BERYLLIUM	1.4 J	1.3

Note: ^(a) This value represents the upper tolerance interval of the 95 percent/95 percent STI (95/95 STI). The 95/95 STI is the value below which 95 percent of the groundwater samples are expected to fall 95 percent of the time, based on previous groundwater samples collected from NAS Alameda from areas of non-industrial use.

J - Estimated concentration

STI - Statistical Tolerance Interval

SUMMARY OF NON POINT SOURCE ORGANIC CHEMICAL ANALYSES FROM SITE 7C
CTO 280
ALAMEDA NAVAL AIR STATION

NPS I.D.	SAMPLE DATE	VOLATILE ORGANIC COMPOUNDS (ug/kg)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/kg)	PESTICIDES, PCB'S AND DIOXINS (ug/kg)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/kg)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/kg)
NPS-S7C-01	07/20/94	ND	ND	NA	TPHC AS MOTOR OIL: 910000J(h)	ND

Analytical Data Comments: ug/kg = Micrograms per kilogram

ug/L = Micrograms per liter

J = Value estimated at reported concentration

ND = Analytes reported below detection limits

NA = Not Analyzed

ppm/v = Parts per million volume

PCBs = Polychlorinated Biphenyls

Analytical QA/QC Comments:

(a) - Surrogate recovery problem

(b) - Blank contamination problems

(c) - Matrix spike recovery problems

(d) - Duplicate (precision) problems

(e) - Internal standards problems

(f) - Calibration problems

(g) - Quantification below reporting limit

(h) - Other problems, refer to data validation narrative

SUMMARY OF QUALITY CONTROL ORGANIC CHEMICAL ANALYSES FROM SITE 7C
CTO 280
ALAMEDA NAVAL AIR STATION

WELL NO.	SAMPLE DATE	VOLATILE ORGANIC COMPOUNDS (ug/L)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/L)	PESTICIDES, PCB'S AND DIOXINS (ug/L)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/L)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/L)
S7C-ER-01	07/28/94	ND	ND	NA	ND	ND
S7C-ER-02	07/29/94	ND	ND	NA	TPHC AS MOTOR OIL: 520J(h)	ND
S7C-ER-03	08/01/94	ND	ND	NA	ND	ND
S7C-ER-04	08/02/94	ND	ND	NA	ND	ND
S7C-ER-05	08/17/94	CARBON DISULFIDE: 2	ND	NA	ND	ND
S7C-ER-06	08/23/94	CARBON DISULFIDE: 4J(f)	ND	NA	ND	ND
S7C-TB-01	07/28/94	ETHYLENE DIBROMIDE: NA	NA	NA	NA	NA
S7C-TB-02	07/29/94	1,2-DICHLOROETHANE: 0.7 2-BUTANONE: 210J(f) ETHYLENE DIBROMIDE: NA	NA	NA	NA	NA
S7C-TB-04	08/02/94	ND	NA	NA	NA	NA
S7C-TB-05	08/23/94	ND	NA	NA	NA	NA

Analytical Data Comments: ug/kg = Micrograms per kilogram

ug/L = Micrograms per liter

J = Value estimated at reported concentration

TB = Trip Blank

ER = Equipment Rinsate

ND = Analytes reported below detection limits

NA = Not Analyzed

ppm/v = Parts per million volume

PCBs = Polychlorinated Biphenyls

Analytical QA/QC Comments: (a) - Surrogate recovery problem

(b) - Blank contamination problems

(c) - Matrix spike recovery problems

(d) - Duplicate (precision) problems

(e) - Internal standards problems

(f) - Calibration problems

(g) - Quantification below reporting limit

(h) - Other problems, refer to data validation narrative

SUMMARY OF FIELD WORK FOR SITE 9 CTO 280 ALAMEDA NAVAL AIR STATION

Cone Penetrometer Testing	Shallow HydroPunch	Deep HydroPunch	Soil Sampling	Shallow Wells	Shallow Piezometers	Deep Wells	Groundwater Sampling	Non-Point Source Sampling	Video Inspection
CPT-S09-01	SHP-S09-05	DHP-S09-01	CPT-S09-05	M09-05	PEZ-S09-05	D09-01	MW410-1	NPS-S09-01	X
CPT-S09-02	SHP-S09-06	DHP-S09-02	CPT-S09-06	M09-06	PEZ-S09-06		MW410-2	NPS-S09-02	
CPT-S09-03	SHP-S09-07	DHP-S09-03	CPT-S09-07		PEZ-S09-07		MW410-3	NPS-S09-03	
CPT-S09-04	SHP-S09-08	DHP-S09-04	CPT-S09-08		PEZ-S09-08		MW410-4		
CPT-S09-05	SHP-S09-09	DHP-S09-05	CPT-S09-09		PEZ-S09-09		M09-05		
CPT-S09-06	SHP-S09-10	DHP-S09-06	CPT-S09-10		PEZ-S09-10		M09-06		
CPT-S09-07	SHP-S09-11	DHP-S09-07	M09-05				D09-01		
CPT-S09-08	SHP-S09-12	DHP-S09-08	M09-06						
CPT-S09-09		DHP-S09-09							
CPT-S09-10		DHP-S09-10							
CPT-S09-11		DHP-S09-11							
CPT-S09-12		DHP-S09-12							

SUMMARY OF SOIL ORGANIC CHEMICAL ANALYSES FROM SITE 9
CTO 280
ALAMEDA NAVAL AIR STATION

WELL NO.	SAMPLE DATE	SAMPLE DEPTH (feet bgs)	USCS CLASSIFICATION	FIELD SCREEN (ppm/v)	VOLATILE ORGANIC COMPOUNDS (ug/kg)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/kg)	PESTICIDES, PCB'S AND DIOXINS (ug/kg)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/kg)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/kg)
M09-05	11/05/94	1.5	SP	0.0	ND	NA	NA	NA	NA
M09-05	11/05/94	3.0	SP	0.0	ND	NA	NA	NA	NA
M09-05	11/05/94	5.0	SP	0.0	ND	NA	NA	NA	NA
M09-06	11/05/94	1.0	SP	0.0	ND	NA	NA	NA	NA
M09-06	11/05/94	2.5	SP	0.0	ND	NA	NA	NA	NA
M09-06	11/05/94	5.5	SP	0.0	ND	NA	NA	NA	NA
CPT-S09-05	09/08/94	0.0	--	--	ND	NA	NA	NA	NA
CPT-S09-05	09/08/94	2.5	--	--	ND	NA	NA	NA	NA
CPT-S09-05	09/08/94	5.0	--	--	ETHYLBENZENE 160 XYLENE (TOTAL) 86	NA	NA	NA	NA
CPT-S09-06	09/08/94	0.5	--	--	ND	NA	NA	NA	NA
CPT-S09-06	09/08/94	2.5	--	--	ND	NA	NA	NA	NA
CPT-S09-06	09/08/94	5.0	--	--	ND	NA	NA	NA	NA

SUMMARY OF SOIL ORGANIC CHEMICAL ANALYSES FROM SITE 9
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

WELL NO.	SAMPLE DATE	SAMPLE DEPTH (feet bgs)	USCS CLASSIFICATION **	FIELD SCREEN (ppm/v) ***	VOLATILE ORGANIC COMPOUNDS (ug/kg)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/kg)	PESTICIDES, PCB'S AND DIOXINS (ug/kg)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/kg)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/kg)
CPT-S09-07	09/07/94	0.5	--	--	ND	NA	NA	NA	NA
CPT-S09-07	09/07/94	2.5	--	--	XYLENE (TOTAL) 240	NA	NA	NA	NA
CPT-S09-07	09/07/94	5.0	--	--	ND	NA	NA	NA	NA
CPT-S09-08	09/08/94	0.5	--	--	ND	NA	NA	NA	NA
CPT-S09-08	09/08/94	2.5	--	--	XYLENE (TOTAL) 120	NA	NA	NA	NA
CPT-S09-08	09/09/94	5.0	--	--	XYLENE (TOTAL) 2900	NA	NA	NA	NA
CPT-S09-09	09/07/94	0.5	--	--	ND	NA	NA	NA	NA
CPT-S09-09	09/07/94	2.5	--	--	ND	NA	NA	NA	NA
CPT-S09-09	09/07/94	5.0	--	--	ND	NA	NA	NA	NA
CPT-S09-10	09/09/94	0.5	--	--	1,2-DICHLOROETHENE (TOTAL) 130 ETHYLBENZENE 200 TOLUENE 49J(g) XYLENE (TOTAL) 3100	NA	NA	NA	NA
CPT-S09-10	09/09/94	2.5	--	--	XYLENE (TOTAL) 39J(g)	NA	NA	NA	NA

SUMMARY OF SOIL ORGANIC CHEMICAL ANALYSES FROM SITE 9
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

WELL NO.	SAMPLE DATE	SAMPLE DEPTH (feet bgs)	USCS CLASSIFICATION ..	FIELD SCREEN (ppm/v) ...	VOLATILE ORGANIC COMPOUNDS (ug/kg)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/kg)	PESTICIDES, PCB'S AND DIOXINS (ug/kg)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/kg)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/kg)
CPT-S09-10	09/09/94	5.0	--	--	XYLENE (TOTAL): 330	NA	NA	NA	NA

* Sample depth indicated represents the top of an 18-inch sample interval.

** USCS Interpretation (for soil borings only):

GW = well-graded gravel	SW = well-graded sand	ML = inorganic silt and very fine sands	MH = inorganic silts, micaceous or diatomaceous
GP = poorly-graded gravel	SP = poorly-graded sand	CL = inorganic clay, low-med plasticity	fine sand or silty soils
GM = silty gravel	SM = silty sand	CH = inorganic clay, high plasticity	
GC = clayey gravel	SC = clayey sand	OH = organic silt/clay, med - high plasticity	
		PT = peat	

*** Field screening results were obtained using a photoionization detector calibrated using a 100 ppm/v isobutylene standard gas (for soil borings only).

Analytical Data Comments: ug/kg = Micrograms per kilogram

ND = Analytes reported below detection limits

ug/L = Micrograms per liter

NA = Not Analyzed

J = Value estimated at reported concentration

ppm/v = Parts per million volume

PCBs = Polychlorinated Biphenyls

Analytical QA/QC Comments: (a) - Surrogate recovery problem
 (b) - Blank contamination problems
 (c) - Matrix spike recovery problems
 (d) - Duplicate (precision) problems

(e) - Internal standards problems
 (f) - Calibration problems
 (g) - Quantification below reporting limit
 (h) - Other problems, refer to data validation narrative

"--" = Not Applicable

CPT = Soil Sample obtained with hand-auger sampling tool.

**SUMMARY OF GROUNDWATER ORGANIC CHEMICAL ANALYSES AND TDS FROM SITE 9
CTO 280
ALAMEDA NAVAL AIR STATION**

WELL NO.	WATER BEARING ZONE	SAMPLE DATE	VOLATILE ORGANIC COMPOUNDS (ug/L)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/L)	PESTICIDES, PCB'S AND DIOXINS (ug/L)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/L)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/L)	TOTAL DISSOLVED SOLIDS (mg/L)
D09-01	2	12/20/94	ND	ND	NA	ND	ND	28000
M09-05	1	11/30/94	ND	ND	NA	ND	ND	200 J(h)
M09-05 DUP	1	11/30/94	ND	ND	NA	ND	ND	180
M09-06	1	11/30/94	ND	ND	NA	ND	ND	210
MW410-1	1	10/18/94	ND	ND	NA	TPHC AS DIESEL: 190J(h)	ND	466
MW410-2	1	10/18/94	1,2-DICHLOROETHENE (TOTAL) 4	ND	NA	TPHC AS MOTOR OIL: 570J(h)	TPHC AS UNLEADED GASOLINE 60J(h)	750
MW410-3	1	10/18/94	ND	ND	NA	TPHC AS MOTOR OIL: 890J(h)	ND	354
MW410-4	1	10/18/94	1,1,1-TRICHLOROETHANE 2 1,1-DICHLOROETHANE 1 TRICHLOROETHENE 2	ND	NA	TPHC AS MOTOR OIL: 620J(h)	ND	2610
DHP-S09-01	2	07/28/94	ETHYLENE DIBROMIDE NA	ND	NA	NA	NA	6020
DHP-S09-02	2	07/28/94	1,1-DICHLOROETHANE 29 1,2-DICHLOROETHENE (TOTAL) 1 ETHYLENE DIBROMIDE NA	ND	NA	NA	NA	1140
DHP-S09-03	2	07/29/94	ETHYLENE DIBROMIDE NA	ND	NA	NA	NA	1170
DHP-S09-04	2	08/26/94	ND	ND	NA	NA	NA	1430
DHP-S09-05	2	08/23/94	ND	ND	NA	NA	NA	NA
SHP-S09-05	1	08/24/94	2-BUTANONE 59J(a,f) CARBON DISULFIDE 4J(a,f) ETHYLBENZENE 4J(a) XYLENE (TOTAL) 6J(a)	ND	NA	NA	NA	6400

SUMMARY OF GROUNDWATER ORGANIC CHEMICAL ANALYSES AND TDS FROM SITE 9
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

WELL NO.	WATER BEARING ZONE	SAMPLE DATE	VOLATILE ORGANIC COMPOUNDS (ug/L)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/L)	PESTICIDES, PCB'S AND DIOXINS (ug/L)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/L)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/L)	TOTAL DISSOLVED SOLIDS (mg/L)
SHP-S09-06	1	09/08/94	1,2-DICHLOROETHENE (TOTAL) 400 ETHYLBENZENE 86 TOLUENE 230 VINYL CHLORIDE 220 XYLENE (TOTAL) 340	NAPHTHALENE 77	NA	NA	NA	2550
DHP-S09-07	2	09/07/94	ND	ND	NA	NA	NA	1200
SHP-S09-07	1	09/07/94	1,1-DICHLOROETHANE 5 1,2-DICHLOROETHENE (TOTAL) 3 4-METHYL-2-PENTANONE 5J(f) ACETONE 150J(f) BENZENE 1 ETHYLBENZENE 7 TOLUENE 7 VINYL CHLORIDE 18 XYLENE (TOTAL) 41	4-METHYLPHENOL 1200	NA	NA	NA	2550
DHP-S09-08	2	09/06/94	1,1-DICHLOROETHANE 2	ND	NA	NA	NA	1080
SHP-S09-08	1	09/09/94	1,2-DICHLOROETHANE 0.5 1,2-DICHLOROETHENE (TOTAL) 1 2-BUTANONE 63J(f) ETHYLBENZENE 23 TOLUENE 3 XYLENE (TOTAL) 56	NAPHTHALENE 250J(a)	NA	NA	NA	504
DHP-S09-09	2	09/12/94	1,2-DICHLOROETHANE 0.6 1,2-DICHLOROPROPANE 2	ND	NA	NA	NA	1210
SHP-S09-09	1	09/08/94	1,1-DICHLOROETHANE 110 1,2-DICHLOROETHENE (TOTAL) 59 CHLOROBENZENE 11 ETHYLBENZENE 11 TOLUENE 34 TRICHLOROETHENE 22 XYLENE (TOTAL) 150	NAPHTHALENE 74 PHENOL 45	NA	NA	NA	688
DHP-S09-10	2	09/09/94	1,1-DICHLOROETHANE 2	ND	NA	NA	NA	1240

SUMMARY OF GROUNDWATER ORGANIC CHEMICAL ANALYSES AND TDS FROM SITE 9
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

WELL NO.	WATER BEARING ZONE	SAMPLE DATE	VOLATILE ORGANIC COMPOUNDS (ug/L)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/L)	PESTICIDES, PCB'S AND DIOXINS (ug/L)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/L)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/L)	TOTAL DISSOLVED SOLIDS (mg/L)
SHP-S09-10	1	09/06/94	1,2-DICHLOROETHENE (TOTAL): 2400 ETHYLBENZENE: 120 TOLUENE: 220 XYLENE (TOTAL): 1200	NAPHTHALENE: 29000	NA	NA	NA	NA
DHP-S09-11	2	08/25/94	4-METHYL-2-PENTANONE: 0.7J(g) CARBON DISULFIDE: 0.8J(f)	ND	NA	NA	NA	3490
SHP-S09-11	1	08/25/94	CARBON DISULFIDE: 20J(f) TOLUENE: 0.2J(g)	BENZO(A)ANTHRACENE: 1J(g) BENZO(A)PYRENE: 2J(g) BENZO(B)FLUORANTHENE: 2J(g) BENZO(G,H,I)PERYLENE: 2J(g) BENZO(K)FLUORANTHENE: 0.8J(f,g) CHRYSENE: 1J(g) FLUORANTHENE: 3J(g) INDENO(1,2,3-CD)PYRENE: 1J(g) NAPHTHALENE: 0.9J(g) PHENANTHRENE: 2J(g) PYRENE: 3J(g)	NA	NA	NA	6930
DHP-S09-12	2	08/25/94	ND	ND	NA	NA	NA	1610
SHP-S09-12	1	08/24/94	1,1-DICHLOROETHANE: 1J(g) CARBON DISULFIDE: 9J(f)	PYRENE: 2J(g)	NA	NA	NA	612

Analytical Data Comments: ug/kg = Micrograms per kilogram

ug/L = Micrograms per liter

J = Value estimated at reported concentration

SHP = "Shallow" HydroPunch obtained from first water-bearing zone.

DHP = "Deep" HydroPunch obtained from second water-bearing zone.

ND = Analytes reported below detection limits

NA = Not Analyzed

ppm/v = Parts per million volume

PCBs = Polychlorinated Biphenyls

Analytical QA/QC Comments: (a) - Surrogate recovery problem

(b) - Blank contamination problems

(c) - Matrix spike recovery problems

(d) - Duplicate (precision) problems

(e) - Internal standards problems

(f) - Calibration problems

(g) - Quantification below reporting limit

(h) - Other problems, refer to data validation narrative

TABLE 13-4

**METAL RESULTS IN GROUNDWATER EXCEEDING 95 PERCENT/95 PERCENT STI
FROM SITE 9
CTO 280
ALAMEDA NAVAL AIR STATION**

Sample Location	Sample Date	Metal	Detected Concentration (ug/L)	Upper Tolerance Limit (ug/L) ^(a)
SHP-S09-06	09/08/94	BERYLLIUM	2.8 J	1.3
	09/08/94	NICKEL	31.7 J	6.6
SHP-S09-07	09/07/94	BERYLLIUM	4.3 J	1.3
	09/07/94	CHROMIUM	24.5	3.2
	09/07/94	NICKEL	157	6.6
	09/07/94	ZINC	144	25.7
SHP-S09-08	09/09/94	BERYLLIUM	2.9 J	1.3
SHP-S09-09	09/08/94	BERYLLIUM	4.3 J	1.3
SHP-S09-10	09/06/94	BERYLLIUM	2.8 J	1.3
	09/06/94	CHROMIUM	206 J	3.2
	09/06/94	COPPER	28.1	27.7
	09/06/94	LEAD	28.9 J	1
	09/06/94	NICKEL	39.7 J	6.6
	09/06/94	VANADIUM	102 J	70.7
	09/06/94	ZINC	42.6	25.7
SHP-S09-12	08/24/94	ZINC	84.0	25.7

Note: ^(a) This value represents the upper tolerance interval of the 95 percent/95 percent STI (95/95 STI). The 95/95 STI is the value below which 95 percent of the groundwater samples are expected to fall 95 percent of the time, based on previous groundwater samples collected from NAS Alameda from areas of non-industrial use.

J - Estimated concentration

STI - Statistical Tolerance Interval

SUMMARY OF NON POINT SOURCE ORGANIC CHEMICAL ANALYSES FROM SITE 9
CTO 280
ALAMEDA NAVAL AIR STATION

NPS I.D.	SAMPLE DATE	VOLATILE ORGANIC COMPOUNDS (ug/kg)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/kg)	PESTICIDES, PCB'S AND DIOXINS (ug/kg)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/kg)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/kg)
NPS-S09-01	07/19/94	ND	ND	NA	TPHC AS MOTOR OIL: 2370000J(h)	ND
NPS-S09-01DUP	07/19/94	ND	ND	NA	TPHC AS MOTOR OIL: 3200000J(h)	ND
NPS-S09-02	08/24/94	4-METHYL-2-PENTANONE: 18J(e) TOLUENE: 22J(e) XYLENE (TOTAL): 12J(e)	PHENOL: 4700	NA	TPHC AS MOTOR OIL: 7170000J(h)	TPHC AS UNLEADED GASOLINE: 2300J(a,h)
NPS-S09-03	08/24/94	ND	BENZO(A)ANTHRACENE: 690 BENZO(A)PYRENE: 450 BENZO(B)FLUORANTHENE: 680 BENZO(G,H,I)PERYLENE: 420 CHRYSENE: 680 FLUORANTHENE: 1400 INDENO(1,2,3-CD)PYRENE: 420 PYRENE: 1000	NA	TPHC AS MOTOR OIL: 160000J(h)	TPHC AS UNLEADED GASOLINE: 820J(h)

Analytical Data Comments: ug/kg = Micrograms per kilogram

ug/L = Micrograms per liter

J = Value estimated at reported concentration

ND = Analytes reported below detection limits

NA = Not Analyzed

ppm/v = Parts per million volume

PCBs = Polychlorinated Biphenyls

Analytical QA/QC Comments: (a) - Surrogate recovery problem

(b) - Blank contamination problems

(c) - Matrix spike recovery problems

(d) - Duplicate (precision) problems

(e) - Internal standards problems

(f) - Calibration problems

(g) - Quantification below reporting limit

(h) - Other problems, refer to data validation narrative

SUMMARY OF QUALITY CONTROL ORGANIC CHEMICAL ANALYSES FROM SITE 9
CTO 280
ALAMEDA NAVAL AIR STATION

WELL NO.	SAMPLE DATE	VOLATILE ORGANIC COMPOUNDS (ug/L)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/L)	PESTICIDES, PCB'S AND DIOXINS (ug/L)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/L)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/L)
ER	08/26/94	1,2-DICHLOROETHANE 0.5	ND	NA	NA	NA
ER	09/07/94	1,2-DICHLOROETHANE 1	ND	NA	NA	NA
ER	09/09/94	ND	NA	NA	NA	NA
ER	09/08/94	ND	NA	NA	NA	NA
ER	09/08/94	CHLOROFORM 4	ND	NA	NA	NA
ER	09/07/94	ND	NA	NA	NA	NA
ER	09/09/94	ND	ND	NA	NA	NA
ER	09/12/94	ND	ND	NA	NA	NA
S09-ER-01	07/28/94	ND	ND	NA	NA	NA
S09-ER-02	07/29/94	ND	ND	NA	NA	NA
S09-ER-03	08/25/94	CHLOROFORM 4	ND	NA	NA	NA
S09-ER-04	08/24/94	ND	ND	NA	ND	ND
S09-ER-05	08/24/94	1,2-DICHLOROETHANE 1	ND	NA	NA	NA
S09-ER-06	08/23/94	1,2-DICHLOROETHANE 2	ND	NA	NA	NA
S09-TB-01	07/28/94	ND	NA	NA	NA	NA
S09-TB-02	07/29/94	1,2-DICHLOROETHANE 0.9	NA	NA	NA	NA
S09-TB-03	08/23/94	ND	NA	NA	NA	NA
S09-TB-04	08/24/94	ND	NA	NA	NA	NA

SUMMARY OF QUALITY CONTROL ORGANIC CHEMICAL ANALYSES FROM SITE 9
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

WELL NO.	SAMPLE DATE	VOLATILE ORGANIC COMPOUNDS (ug/L)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/L)	PESTICIDES, PCB'S AND DIOXINS (ug/L)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/L)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/L)
S09-TB-05	08/24/94	1,2-DICHLOROETHANE: 1	NA	NA	NA	NA
S09-TB-05	08/25/94	ND	NA	NA	NA	NA
TB	08/26/94	1,2-DICHLOROETHANE: 0.7	NA	NA	NA	NA
TB	09/06/94	1,2-DICHLOROETHANE: 2	NA	NA	NA	NA
TB	09/09/94	ND	NA	NA	NA	NA
TB	09/08/94	1,2-DICHLOROETHANE: 2	NA	NA	NA	NA
TB	09/06/94	1,2-DICHLOROETHANE: 2	NA	NA	NA	NA
TB	10/19/94	ND	NA	NA	NA	NA
TB	10/18/94	1,2-DICHLOROETHANE: 1	NA	NA	NA	NA
TB	09/12/94	ND	NA	NA	NA	NA

Analytical Data Comments: ug/kg = Micrograms per kilogram

ug/L = Micrograms per liter

J = Value estimated at reported concentration

TB = Trip Blank

ER = Equipment Rinsate

ND = Analytes reported below detection limits

NA = Not Analyzed

ppm/v = Parts per million volume

PCBs = Polychlorinated Biphenyls

Analytical QA/QC Comments: (a) - Surrogate recovery problem
(b) - Blank contamination problems
(c) - Matrix spike recovery problems
(d) - Duplicate (precision) problems

(e) - Internal standards problems
(f) - Calibration problems
(g) - Quantification below reporting limit
(h) - Other problems, refer to data validation narrative

TABLE 14-1

**SUMMARY OF FIELD WORK FOR SITE 10B
CTO 280
ALAMEDA NAVAL AIR STATION**

Cone Penetrometer Testing	Shallow HydroPunch	Deep HydroPunch	Soil Sampling	Shallow Wells	Shallow Piezometers	Deep Wells	Groundwater Sampling	Non-Point Source Sampling
CPT-S10B-01	CPT-S10B-05S	DHP-S10B-01	B10B-04	M10B-01	PEZ-S10B-05	D10B-01	MW530-1	NPS-S10B-01
CPT-S10B-02	CPT-S10B-06S	DHP-S10B-02	B10B-05		PEZ-S10B-06	D10B-02	MW530-2	NPS-S10B-02
CPT-S10B-03		DHP-S10B-03	B10B-06		SHP-S10B-05		MW530-3	
CPT-S10B-04		DHP-S10B-04	B10B-07		SHP-S10B-06		M10B-01	
CPT-S10B-05		DHP-S10B-05	M10B-01				D10B-01	
CPT-S10B-06							D10B-02	

SUMMARY OF SOIL ORGANIC CHEMICAL ANALYSES FROM SITE 10B
CTO 280
ALAMEDA NAVAL AIR STATION

WELL NO.	SAMPLE DATE	SAMPLE DEPTH (feet bgs)	USCS CLASSIFICATION ..	FIELD SCREEN (ppm/v) ...	VOLATILE ORGANIC COMPOUNDS (ug/kg)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/kg)	PESTICIDES, PCB'S AND DIOXINS (ug/kg)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/kg)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/kg)
B10B-04	08/19/94	0.5	GW	0.0	ND	ND	NA	NA	NA
B10B-04	08/19/94	3.0	SP	0.0	ND	ND	NA	NA	NA
B10B-04	08/19/94	5.0	SP	0.0	ND	ND	NA	NA	NA
B10B-05	08/19/94	0.5	SW	0.0	ND	ND	NA	NA	NA
B10B-05	08/19/94	2.5	SP	0.0	ND	ND	NA	NA	NA
B10B-05	08/19/94	5.0	SP	0.0	ND	ND	NA	NA	NA
B10B-05 DUP	08/19/94	2.5	SP	0.0	ND	ND	NA	NA	NA
B10B-06	08/19/94	0.5	SP	0.0	ND	ND	NA	NA	NA
B10B-06	08/19/94	2.5	SP	0.0	ND	ND	NA	NA	NA
B10B-06	08/19/94	5.0	SP	101	ND	2-METHYLNAPHTHALENE 9400	NA	NA	NA
B10B-07	08/19/94	0.5	SW	0.0	ND	ND	NA	TPHC AS MOTOR OIL 70000J(h)	ND
B10B-07	08/19/94	2.5	SP	0.0	ND	ND	NA	TPHC AS MOTOR OIL 71000J(h)	ND

SUMMARY OF SOIL ORGANIC CHEMICAL ANALYSES FROM SITE 10B
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

WELL NO.	SAMPLE DATE	SAMPLE DEPTH (feet bgs)	USCS CLASSIFICATION ..	FIELD SCREEN (ppm/v) ***	VOLATILE ORGANIC COMPOUNDS (ug/kg)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/kg)	PESTICIDES, PCB'S AND DIOXINS (ug/kg)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/kg)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/kg)
B10B-07	08/19/94	5.0	SP	0.0	ND	ND	NA	ND	ND
M10B-01	11/05/94	0.5	SP	0.0	ND	ND	NA	ND	ND
M10B-01	11/05/94	3.0	SP	0.0	ND	ND	NA	ND	ND
M10B-01	11/05/94	5.0	SP	0.0	ND	ND	NA	TPHC AS MOTOR OIL: 30000J(h)	ND
M10B-01 DUP	11/05/94	5.0	SP	0.0	ND	ND	NA	ND	ND

* Sample depth... indicated represents the top of an 18-inch sample interval.

** USCS Interpretation (for soil borings only):

GW = well-graded gravel	SW = well-graded sand	ML = inorganic silt and very fine sands	MH = inorganic silts, micaceous or diatomaceous fine sand or silty soils
GP = poorly-graded gravel	SP = poorly-graded sand	CL = inorganic clay, low-med plasticity	CH = inorganic clay, high plasticity
GM = silty gravel	SM = silty sand	OL = organic silts and organic silty clays	OH = organic silt/clay, med - high plasticity
GC = clayey gravel	SC = clayey sand		PT = peat

*** Field screening results were obtained using a photoionization detector calibrated using a 100 ppm/v isobutylene standard gas (for soil borings only).

Analytical Data Comments:	ug/kg = Micrograms per kilogram	ND = Analytes reported below detection limits
	ug/L = Micrograms per liter	NA = Not Analyzed
	J = Value estimated at reported concentration	ppm/v = Parts per million volume
		PCBs = Polychlorinated Biphenyls

Analytical QA/QC Comments:	(a) - Surrogate recovery problem	(e) - Internal standards problems
	(b) - Blank contamination problems	(f) - Calibration problems
	(c) - Matrix spike recovery problems	(g) - Quantification below reporting limit
	(d) - Duplicate (precision) problems	(h) - Other problems, refer to data validation narrative

"-" = Not Applicable

SUMMARY OF GROUNDWATER ORGANIC CHEMICAL ANALYSES AND TDS FROM SITE 10B
CTO 280
ALAMEDA NAVAL AIR STATION

WELL NO.	WATER BEARING ZONE	SAMPLE DATE	VOLATILE ORGANIC COMPOUNDS (ug/L)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/L)	PESTICIDES, PCB'S AND DIOXINS (ug/L)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/L)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/L)	TOTAL DISSOLVED SOLIDS (mg/L)
D10B-01	2	12/15/94	ND	ND	NA	ND	ND	11000
D10B-02	2	12/15/94	ND	ND	NA	ND	ND	5500
M10B-01	1	12/01/94	ND	ND	NA	TPHC AS MOTOR OIL 1100J(h)	ND	210
MW530-1	1	10/19/94	ETHYLBENZENE 2 XYLENE (TOTAL) 23	2-METHYLNAPHTHALENE 12 NAPHTHALENE 17	NA	TPHC AS DIESEL 4820J(h)	TPHC AS UNLEADED GASOLINE 670J(h)	1400
MW530-2	1	10/19/94	ND	ND	NA	TPHC AS MOTOR OIL 790J(h)	ND	846
MW530-3	1	10/19/94	ND	ND	NA	TPHC AS MOTOR OIL 570J(h)	ND	404
DHP-S10B-01	2	07/15/94	BENZENE 28 ETHYLBENZENE 9 TOLUENE 1 XYLENE (TOTAL) 54	ND	NA	TPHC AS DIESEL 7620J(h)	TPHC AS UNLEADED GASOLINE 630J(h)	14300
DHP-S10B-02	2	07/15/94	ND	ND	NA	TPHC AS MOTOR OIL 530J(h)	ND	1090
DHP-S10B-03	2	07/18/94	ND	ND	NA	TPHC AS MOTOR OIL 890J(h)	ND	NA
DHP-S10B-04	2	07/15/94	ND	ND	NA	TPHC AS MOTOR OIL 2650	ND	5190
DHP-S10B-05	2	07/15/94	ND	ND	NA	ND	ND	NA
SHP-S10B-05	1	08/22/94	2-BUTANONE 4200J(f,h)	ND	NA	TPHC AS MOTOR OIL 3620J(h)	TPHC AS UNLEADED GASOLINE 460J(h)	NA
SHP-S10B-06	1	08/22/94	BENZENE 0.5 CARBON DISULFIDE 170J(f,h)	ND	NA	TPHC AS DIESEL 1240J(h)	ND	NA

Analytical Data

Units: ug/kg = Micrograms per kilogram

ug/L = Micrograms per liter

J = Value estimated at reported concentration

SHP = "Shallow" HydroPunch obtained from first water-bearing zone.

DHP = "Deep" HydroPunch obtained from second water-bearing zone.

ND = Analytes reported below detection limits

NA = Not Analyzed

ppm/v = Parts per million volume

PCBs = Polychlorinated Biphenyls

Analytical QA/QC Comments:

(a) - Surrogate recovery problem

(b) - Blank contamination problems

(c) - Matrix spike recovery problems

(d) - Duplicate (precision) problems

(e) - Internal standards problems

(f) - Calibration problems

(g) - Quantification below reporting limit

(h) - Other problems, refer to data validation narrative

TABLE 14-4

**METAL RESULTS IN GROUNDWATER EXCEEDING 95 PERCENT/95 PERCENT STI
FROM SITE 10B
CTO 280
ALAMEDA NAVAL AIR STATION**

Sample Location	Sample Date	Metal	Detected Concentration (ug/L)	Upper Tolerance Limit (ug/L) ^(a)
SHP-S10B-06	08/22/94	CHROMIUM	7.5 J	3.2
	08/22/94	ZINC	28.1	25.7
M10B-01	12/01/94	BERYLLIUM	1.8 J	1.3
	12/01/94	NICKEL	11.3 J	6.6

Note: ^(a) This value represents the upper tolerance interval of the 95 percent/95 percent STI (95/95 STI). The 95/95 STI is the value below which 95 percent of the groundwater samples are expected to fall 95 percent of the time, based on previous groundwater samples collected from NAS Alameda from areas of non-industrial use.

J - Estimated concentration

STI - Statistical Tolerance Interval

SUMMARY OF NON POINT SOURCE ORGANIC CHEMICAL ANALYSES FROM SITE 10B
CTO 280
ALAMEDA NAVAL AIR STATION

NPS I.D.	SAMPLE DATE	VOLATILE ORGANIC COMPOUNDS (ug/kg)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/kg)	PESTICIDES, PCB'S AND DIOXINS (ug/kg)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/kg)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/kg)
NPS-S10B-01	07/20/94	2-HEXANONE 14J(a) 4-METHYL-2-PENTANONE: 58J(a)	BENZO(A)ANTHRACENE 1300 BENZO(A)PYRENE: 1200 BENZO(B)FLUORANTHENE: 2100 BENZO(G,H,I)PERYLENE: 550 BENZO(K)FLUORANTHENE: 1000 CHRYSENE 1300 FLUORANTHENE: 2800 INDENO(1,2,3-CD)PYRENE: 720 PHENANTHRENE 880 PYRENE 2200	NA	TPHC AS MOTOR OIL: 770000J(h)	TPHC AS UNLEADED GASOLINE 3800J(h)
NPS-S10B-01DUP	07/20/94	ND	BENZO(A)ANTHRACENE 1100 BENZO(A)PYRENE: 1100 BENZO(B)FLUORANTHENE: 2300 BENZO(G,H,I)PERYLENE: 500 BENZO(K)FLUORANTHENE: 1100 CHRYSENE: 1500 FLUORANTHENE: 2700 INDENO(1,2,3-CD)PYRENE: 750 PHENANTHRENE: 710 PYRENE 2100	NA	TPHC AS MOTOR OIL: 1320000J(h)	TPHC AS UNLEADED GASOLINE 3200J(h)
NPS-S10B-02	07/20/94	TOLUENE 43	BENZO(A)PYRENE: 2500 BENZO(B)FLUORANTHENE: 4200 CHRYSENE: 2400 FLUORANTHENE: 2200 PYRENE 2500	NA	TPHC AS MOTOR OIL: 5850000J(h)	ND

Analytical Data Comments: ug/kg = Micrograms per kilogram

ug/L = Micrograms per liter

J = Value estimated at reported concentration

ND = Analytes reported below detection limits

NA = Not Analyzed

ppm/v = Parts per million volume

PCBs = Polychlorinated Biphenyls

Analytical QA/QC Comments: (a) - Surrogate recovery problem

(b) - Blank contamination problems

(c) - Matrix spike recovery problems

(d) - Duplicate (precision) problems

(e) - Internal standards problems

(f) - Calibration problems

(g) - Quantification below reporting limit

(h) - Other problems, refer to data validation narrative

SUMMARY OF QUALITY CONTROL ORGANIC CHEMICAL ANALYSES FROM SITE 10B
CTO 280
ALAMEDA NAVAL AIR STATION

WELL NO.	SAMPLE DATE	VOLATILE ORGANIC COMPOUNDS (ug/L)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/L)	PESTICIDES, PCB'S AND DIOXINS (ug/L)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/L)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/L)
S10B-ER-01	07/15/94	ND	ND	NA	ND	ND
S10B-ER-02	07/15/94	ND	ND	NA	ND	ND
S10B-ER-03	07/18/94	ND	ND	NA	ND	ND
S10B-ER-04	08/19/94	ND	ND	NA	ND	ND
S10B-ER-06	11/06/94	1,2-DICHLOROETHANE 0.8	ND	NA	ND	ND
S10B-TB	07/18/94	ND	NA	NA	NA	NA
S10B-TB-01	07/15/94	ND	NA	NA	NA	NA
S10B-TB-02	07/15/94	ND	NA	NA	NA	NA
S10B-TB-03	07/15/94	ND	NA	NA	NA	NA
S10B-TB-04	08/19/94	1,2-DICHLOROETHANE 0.9	NA	NA	NA	NA
S10B-TB-05	08/22/94	ND	NA	NA	NA	NA

Analytical Data Comments: ug/kg = Micrograms per kilogram

ug/L = Micrograms per liter

J = Value estimated at reported concentration

TB = Trip Blank

ER = Equipment Rinsate

ND = Analytes reported below detection limits

NA = Not Analyzed

ppm/v = Parts per million volume

PCBs = Polychlorinated Biphenyls

Analytical QA/QC Comments: (a) - Surrogate recovery problem

(b) - Blank contamination problems

(c) - Matrix spike recovery problems

(d) - Duplicate (precision) problems

(e) - Internal standards problems

(f) - Calibration problems

(g) - Quantification below reporting limit

(h) - Other problems, refer to data validation narrative

TABLE 15-1

**SUMMARY OF FIELD WORK FOR SITE 13
CTO 280
ALAMEDA NAVAL AIR STATION**

Cone Penetrometer Testing	Deep HydroPunch	Soil Sampling	Shallow Wells	Deep Wells	Groundwater Sampling	Non-Point Source Sampling	GeoProbe Investigation
CPT-S13-02	DHP-S13-02	B13-28	M13-06	D13-01	MW-1	NPS-S13-01	X
CPT-S13-03	DHP-S13-03	B13-29	M13-07		MWOR-1		
CPT-S13-04	DHP-S13-04	B13-30	M13-08		MWOR-2		
CPT-S13-05	DHP-S13-05	B13-31	M13-09		MWOR-3		
		M13-32			MWOR-4		
		M13-06			MWOR-5		
		M13-07			M13-06		
		M13-08			M13-07		
		M13-09			M13-08		
					M13-09		
					D13-01		

SUMMARY OF SOIL ORGANIC CHEMICAL ANALYSES FROM SITE 13
CTO 280
ALAMEDA NAVAL AIR STATION

WELL NO.	SAMPLE DATE	SAMPLE DEPTH (feet bgs)	USCS CLASSIFICATION **	FIELD SCREEN (ppm/v) ***	VOLATILE ORGANIC COMPOUNDS (ug/kg)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/kg)	PESTICIDES, PCB'S AND DIOXINS (ug/kg)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/kg)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/kg)
B13-28	12/09/94	0.0	SP	110	ND	NA	NA	TPHC AS MOTOR OIL: 740000J(h)	ND
B13-28	12/09/94	2.5	SP	110	ND	NA	NA	TPHC AS MOTOR OIL: 43000J(h)	TPHC AS UNLEADED GASOLINE 760000J(h)
B13-28	12/09/94	5.0	SP	450	ETHYLBENZENE: 21J(g) XYLENE (TOTAL): 62	NA	NA	TPHC AS MOTOR OIL: 1550000J(h)	TPHC AS UNLEADED GASOLINE 9310000J(h)
B13-29	12/09/94	0.0	SP	6	BENZENE: 26 ETHYLBENZENE: 97 XYLENE (TOTAL): 240	NA	NA	TPHC AS MOTOR OIL: 6920000J(a,h)	TPHC AS UNLEADED GASOLINE 1710000J(h)
B13-29	12/09/94	2.5	SP	6	BENZENE: 82 ETHYLBENZENE: 560 TOLUENE: 220 XYLENE (TOTAL): 2800	NA	NA	TPHC AS MOTOR OIL: 27500000J(a,h)	TPHC AS UNLEADED GASOLINE 3300000J(h)
B13-29	12/09/94	5.0	SC	208	XYLENE (TOTAL): 18	NA	NA	TPHC AS MOTOR OIL: 2170000J(h)	TPHC AS UNLEADED GASOLINE 2750000J(h)
B13-29 DUP	12/09/94	0.0	SP	6	BENZENE: 24 ETHYLBENZENE: 56 XYLENE (TOTAL): 130	NA	NA	TPHC AS MOTOR OIL: 69600000J(a,h)	TPHC AS UNLEADED GASOLINE 1350000J(h)
B13-30	12/09/94	0.0	SP-SM	0.0	ND	NA	NA	TPHC AS MOTOR OIL: 297000000J(a,h)	TPHC AS UNLEADED GASOLINE 320000J(h)
B13-30	12/09/94	2.5	SP-SM	0.0	XYLENE (TOTAL): 21	NA	NA	TPHC AS MOTOR OIL: 7550000J(h)	TPHC AS UNLEADED GASOLINE 780000J(h)

SUMMARY OF SOIL ORGANIC CHEMICAL ANALYSES FROM SITE 13
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

WELL NO.	SAMPLE DATE	SAMPLE DEPTH (feet bgs)	USCS CLASSIFICATION	FIELD SCREEN (ppmv)	VOLATILE ORGANIC COMPOUNDS (ug/kg)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/kg)	PESTICIDES, PCB'S AND DIOXINS (ug/kg)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/kg)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/kg)
B13-30	12/09/94	5.0	SM	0.0	ETHYLBENZENE: 5100 XYLENE (TOTAL): 38000	NA	NA	TPHC AS MOTOR OIL: 668000J(h)	TPHC AS UNLEADED GASOLINE: 810000J(h)
B13-31	12/09/94	0.0	SP	72	ACETONE: 180J(f) XYLENE (TOTAL): 20	NA	NA	TPHC AS MOTOR OIL: 67200000J(a,h)	TPHC AS UNLEADED GASOLINE: 8800J(a,h)
B13-31	12/09/94	2.5	SP	72	ETHYLBENZENE: 97 XYLENE (TOTAL): 370	NA	NA	TPHC AS MOTOR OIL: 3200000J(h)	TPHC AS UNLEADED GASOLINE: 140000J(h)
B13-31	12/09/94	5.0	SP	123	ACETONE: 240J(f) ETHYLBENZENE: 150 XYLENE (TOTAL): 540	NA	NA	TPHC AS MOTOR OIL: 440000J(h)	TPHC AS UNLEADED GASOLINE: 160000J(h)
B13-31 DUP	12/09/94	5.0	SP	123	XYLENE (TOTAL): 54	NA	NA	TPHC AS MOTOR OIL: 47000J(h)	TPHC AS UNLEADED GASOLINE: 120000J(h)
B13-32	08/12/94	0.0	SP	1.5	NA	NA	NA	TPHC AS MOTOR OIL: 57000J(h)	ND
B13-32	08/12/94	2.5	SP	81	ACETONE: 190J(f) XYLENE (TOTAL): 28	NA	NA	TPHC AS MOTOR OIL: 1240000J(h)	TPHC AS UNLEADED GASOLINE: 8900J(h)
B13-32	08/12/94	5.0	SP-SC	15	ETHYLBENZENE: 160 XYLENE (TOTAL): 2900	NA	NA	TPHC AS DIESEL: 2620000J(h)	TPHC AS UNLEADED GASOLINE: 300000J(a,h)
M13-06	08/12/94	0.0	SP-SM	0.0	NA	NA	NA	ND	ND
M13-06	08/12/94	2.0	SP-SM	0.0	ND	NA	NA	ND	ND

SUMMARY OF SOIL ORGANIC CHEMICAL ANALYSES FROM SITE 13
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

WELL NO.	SAMPLE DATE	SAMPLE DEPTH (feet bgs)	USCS CLASSIFICATION **	FIELD SCREEN (ppmv) ***	VOLATILE ORGANIC COMPOUNDS (ug/kg)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/kg)	PESTICIDES, PCB'S AND DIOXINS (ug/kg)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/kg)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/kg)
M13-06	08/12/94	4 0	SP	0 0	ND	NA	NA	ND	ND
M13-07	08/12/94	0 0	GP	0 1	NA	NA	NA	ND	ND
M13-07	08/12/94	1 5	SP	1 2	ND	NA	NA	ND	ND
M13-07	08/12/94	5 0	SP	1 2	ND	NA	NA	ND	ND
M13-07 DUP	08/12/94	2 5	SP	1 2	ND	NA	NA	ND	ND
M13-08	11/19/94	0 0	SP	0 0	ND	NA	NA	ND	ND
M13-08	11/19/94	2 5	SP	0 0	ND	NA	NA	TPHC AS MOTOR OIL 38000J(h)	ND
M13-08	11/19/94	5 0	SP	0 0	ND	NA	NA	ND	ND
M13-09	11/19/94	0 0	SP	0 0	ND	NA	NA	TPHC AS MOTOR OIL 83000J(h)	ND
M13-09	11/19/94	2 5	SP	0 0	ND	NA	NA	TPHC AS MOTOR OIL 430000J(h)	ND
M13-09	11/19/94	5 0	SP	32	ND	NA	NA	TPHC AS MOTOR OIL 530000J(h)	TPHC AS UNLEADED GASOLINE 220000J(h)

* Sample depth indicated represents the top of an 18-inch sample interval.

** USCS Interpretation (for soil borings only):

GW = well-graded gravel	SW = well-graded sand	ML = inorganic silt and very fine sands	MH = inorganic silts, micaceous or diatomaceous fine sand or silty soils
GP = poorly-graded gravel	SP = poorly-graded sand	CL = inorganic clay, low-med plasticity	CH = inorganic clay, high plasticity
GM = silty gravel	SM = silty sand	OL = organic silts and organic silty clays	OH = organic silt/clay, med - high plasticity
GC = clayey gravel	SC = clayey sand		PT = peat

*** Field screening results were obtained using a photoionization detector calibrated using a 100 ppm/v isobutylene standard gas (for soil borings only).

Analytical Data Comments: ug/kg = Micrograms per kilogram

ND = Analytes reported below detection limits

ug/L = Micrograms per liter

NA = Not Analyzed

J = Value estimated at reported concentration

ppm/v = Parts per million volume

PCBs = Polychlorinated Biphenyls

Analytical QA/QC Comments:

(a) - Surrogate recovery problem

(e) - Internal standards problems

(b) - Blank contamination problems

(f) - Calibration problems

(c) - Matrix spike recovery problems

(g) - Quantification below reporting limit

(d) - Duplicate (precision) problems

(h) - Other problems, refer to data validation narrative

"-" = Not Applicable

TABLE 15-3

**METAL RESULTS IN SOIL EXCEEDING TEN TIMES THE STLC
FROM SITE 13
CTO 280
ALAMEDA NAVAL AIR STATION**

Sample Location and Depth	Sample Date	Metal	Detected Concentration (mg/kg)	STLC x 10 (mg/kg) ^(a)
B13-28-0	12/09/94	LEAD	65.7	50.00
B13-29-0	12/09/94	LEAD	378	50.00
B13-29-0	12/09/94	LEAD	148	50.00
B13-30-0	12/09/94	LEAD	207	50.00
	12/09/94	NICKEL	278	200.00
B13-31-0	12/09/94	LEAD	167	50.00
B13-32-0	08/12/94	CADMIUM	18.0	10.00
	08/12/94	LEAD	431	50.00
	08/12/94	ZINC	7120	2500.00
B13-32-2.5	08/12/94	LEAD	79.6	50.00

Note: ^(a) For the purpose of a screening criteria for this document, soil concentrations have been compared to a value equal to 10 times the STLC.

J - Estimated Concentration

STLC - Solubility Threshold Limit Concentration

SUMMARY OF GROUNDWATER ORGANIC CHEMICAL ANALYSES AND TDS FROM SITE 13
CTO 280
ALAMEDA NAVAL AIR STATION

WELL NO.	WATER BEARING ZONE	SAMPLE DATE	VOLATILE ORGANIC COMPOUNDS (ug/L)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/L)	PESTICIDES, PCB'S AND DIOXINS (ug/L)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/L)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/L)	TOTAL DISSOLVED SOLIDS (mg/L)
D13-01	2	12/16/94	1,1,1-TRICHLOROETHANE: 8 1,1-DICHLOROETHENE: 1J(f)	ND	ND	ND	ND	1400
M13-06	1	10/21/94	ND	ND	ND	TPHC AS MOTOR OIL: 1750J(h)	ND	464
M13-07	1	11/01/94	BENZENE: 86	2-METHYLNAPHTHALENE: 130 NAPHTHALENE: 200	ND	TPHC AS DIESEL: 6160J(h)	TPHC AS UNLEADED GASOLINE: 2570J(h)	1670
M13-08	1	12/14/94	ND	ND	ND	ND	ND	490
M13-08 DUP	1	12/14/94	ND	ND	ND	ND	ND	450
M13-09	1	12/08/94	ND	ND	ND	TPHC AS DIESEL: 1100J(h)	TPHC AS UNLEADED GASOLINE: 120J(h)	490
MW-1	1	12/06/94	ND	ND	ND	TPHC AS DIESEL: 10000J(h)	TPHC AS UNLEADED GASOLINE: 220J(h)	680
MWOR-1	1	10/20/94	ND	ND	ND	TPHC AS MOTOR OIL: 750J(h)	ND	954
MWOR-2	1	10/20/94	ND	ND	ND	ND	ND	434
MWOR-3	1	10/20/94	ND	ND	ND	TPHC AS MOTOR OIL: 580J(h)	ND	442
MWOR-4	1	10/20/94	ND	ND	ND	ND	ND	224
MWOR-5	1	10/21/94	ND	ND	ND	TPHC AS MOTOR OIL: 2720J(h)	ND	8610
DHP-S13-02	2	08/02/94	ND	ND	NA	TPHC AS MOTOR OIL: 1370J(f,h)	ND	1810
DHP-S13-03	2	07/20/94	ND	ND	NA	TPHC AS MOTOR OIL: 2270J(h)	ND	435
DHP-S13-04	2	07/20/94	ND	ND	NA	TPHC AS MOTOR OIL: 2100J(h)	ND	250
DHP-S13-05	2	08/29/94	ND	ND	NA	TPHC AS MOTOR OIL: 260J(h)	ND	250

SUMMARY OF GROUNDWATER ORGANIC CHEMICAL ANALYSES AND TDS FROM SITE 13
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

WELL NO.	WATER BEARING ZONE	SAMPLE DATE	VOLATILE ORGANIC COMPOUNDS (ug/L)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/L)	PESTICIDES, PCB'S AND DIOXINS (ug/L)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/L)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/L)	TOTAL DISSOLVED SOLIDS (mg/L)
GPW13-100	1	08/17/94	ND	NA	NA	ND	ND	NA
GPW13-300	1	08/17/94	ND	NA	NA	NA	ND	NA
GPW13-500	1	08/17/94	ND	NA	NA	ND	ND	NA

Analytical Data Comments: ug/kg = Micrograms per kilogram

ug/L = Micrograms per liter

J = Value estimated at reported concentration

SHP = "Shallow" HydroPunch obtained from first water-bearing zone.

DHP = "Deep" HydroPunch obtained from second water-bearing zone.

ND = Analytes reported below detection limits

NA = Not Analyzed

ppm/v = Parts per million volume

PCBs = Polychlorinated Biphenyls

Analytical QA/QC Comments: (a) - Surrogate recovery problem
 (b) - Blank contamination problems
 (c) - Matrix spike recovery problems
 (d) - Duplicate (precision) problems

(e) - Internal standards problems
 (f) - Calibration problems
 (g) - Quantification below reporting limit
 (h) - Other problems, refer to data validation narrative

GPW = GeoProbe Sample from First Water Bearing Zone.

TABLE 15-5

**METAL RESULTS IN GROUNDWATER EXCEEDING 95 PERCENT/95 PERCENT STI
FROM SITE 13
CTO 280
ALAMEDA NAVAL AIR STATION**

Sample Location	Sample Date	Metal	Detected Concentration (ug/L)	Upper Tolerance Limit (ug/L) ^(a)
M13-07	11/01/94	ARSENIC	38.9	36.3
	11/01/94	NICKEL	14.7 J	6.6
M13-08	12/14/94	BERYLLIUM	2.2 J	1.3
M13-08 Dup	12/14/94	BERYLLIUM	1.8 J	1.3
M13-09	12/09/94	BERYLLIUM	1.8 J	1.3
MW-1	12/06/94	BERYLLIUM	1.7 J	1.3
	12/06/94	NICKEL	10.0 J	6.6

Note: ^(a) This value represents the upper tolerance interval of the 95 percent/95 percent STI (95/95 STI). The 95/95 STI is the value below which 95 percent of the groundwater samples are expected to fall 95 percent of the time, based on previous groundwater samples collected from NAS Alameda from areas of non-industrial use.

J - Estimated concentration

STI - Statistical Tolerance Interval

SUMMARY OF QUALITY CONTROL ORGANIC CHEMICAL ANALYSES FROM SITE 13
CTO 280
ALAMEDA NAVAL AIR STATION

WELL NO.	SAMPLE DATE	VOLATILE ORGANIC COMPOUNDS (ug/L)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/L)	PESTICIDES, PCB'S AND DIOXINS (ug/L)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/L)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/L)
ER	12/09/94	ND	NA	NA	ND	ND
S13-ER-03	07/20/94	ND	ND	NA	ND	ND
S13-TB	11/19/94	1,2-DICHLOROETHANE 1	NA	NA	NA	NA
S13-TB-03	07/20/94	ND	NA	NA	NA	NA
S13-TB-04	07/20/94	ND	NA	NA	NA	NA
S13-TB-05	08/02/94	1,2-DICHLOROETHANE 0.5	NA	NA	NA	NA
S13-TB-06	08/12/94	ND	NA	NA	NA	NA
TB	10/20/94	1,2-DICHLOROETHANE 0.6	NA	NA	NA	NA
TB	12/09/94	1,2-DICHLOROETHANE 1	NA	NA	NA	NA

Analytical Data Comments: ug/kg = Micrograms per kilogram

ug/L = Micrograms per liter

J = Value estimated at reported concentration

TB = Trip Blank

ER = Equipment Rinsate

ND = Analytes reported below detection limits

NA = Not Analyzed

ppm/v = Parts per million volume

PCBs = Polychlorinated Biphenyls

Analytical QA/QC Comments: (a) - Surrogate recovery problem

(b) - Blank contamination problems

(c) - Matrix spike recovery problems

(d) - Duplicate (precision) problems

(e) - Internal standards problems

(f) - Calibration problems

(g) - Quantification below reporting limit

(h) - Other problems, refer to data validation narrative

TABLE 16-1

**SUMMARY OF FIELD WORK FOR SITE 15
CTO 280
ALAMEDA NAVAL AIR STATION**

Cone Penetrometer Testing	Deep HydroPunch	Surface Soil Sampling	Groundwater Sampling
CPT-S15-01 CPT-S15-03	DHP-S15-01 DHP-S15-03	S15-56 S15-57 S15-58 S15-59 S15-60 S15-61 S15-62 S15-63	M15-01 M15-03

SUMMARY OF SOIL ORGANIC CHEMICAL ANALYSES FROM SITE 15
CTO 280
ALAMEDA NAVAL AIR STATION

WELL NO.	SAMPLE DATE	SAMPLE DEPTH (feet bgs)	USCS CLASSIFICATION **	FIELD SCREEN (ppmv) ***	VOLATILE ORGANIC COMPOUNDS (ug/kg)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/kg)	PESTICIDES, PCB'S AND DIOXINS (ug/kg)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/kg)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/kg)
S15-56	07/13/94	00	--	--	NA	ND	AROCLOR-1260 860	NA	NA
S15-57	07/13/94	00	--	--	NA	BENZO(A)ANTHRACENE: 2200J(e) BENZO(A)PYRENE: 2500 BENZO(B)FLUORANTHENE: 3800 BENZO(G,H,I)PERYLENE: 780 CHRYSENE: 1900J(e) FLUORANTHENE: 7200 INDENO(1,2,3-CD)PYRENE: 810 PHENANTHRENE: 520 PYRENE: 4300	4,4'-DDT: 58J(h) AROCLOR-1260 170J(g,h)	NA	NA
S15-58	07/13/94	00	--	--	NA	BENZO(A)ANTHRACENE: 1300J(e) BENZO(A)PYRENE: 1800 BENZO(K)FLUORANTHENE: 4200 CHRYSENE: 1800J(e) FLUORANTHENE: 2400 PYRENE: 2800J(e)	ND	NA	NA
S15-59	07/13/94	00	--	--	NA	BENZO(K)FLUORANTHENE: 770 FLUORANTHENE: 560	AROCLOR-1260 2700J(a,h,g)	NA	NA
S15-60	07/13/94	00	--	--	NA	BENZO(A)ANTHRACENE: 1400 BENZO(A)PYRENE: 1400 BENZO(K)FLUORANTHENE: 3400 CHRYSENE: 2200 FLUORANTHENE: 2000 PHENANTHRENE: 1200 PYRENE: 2700	ND	NA	NA
S15-61	07/13/94	00	--	--	NA	ANTHRACENE: 720 BENZO(A)ANTHRACENE: 950 BENZO(A)PYRENE: 1400 BENZO(G,H,I)PERYLENE: 1000 BENZO(K)FLUORANTHENE: 2600 CHRYSENE: 1400	4,4'-DDT: 250J(a,h) AROCLOR-1260 2400J(a,h)	NA	NA

SUMMARY OF SOIL ORGANIC CHEMICAL ANALYSES FROM SITE 15
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

WELL NO.	SAMPLE DATE	SAMPLE DEPTH (feet bgs)	USCS CLASSIFICATION **	FIELD SCREEN (ppmv) ***	VOLATILE ORGANIC COMPOUNDS (ug/kg)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/kg)	PESTICIDES, PCB'S AND DIOXINS (ug/kg)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/kg)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/kg)
S15-61	07/13/94	00				FLUORANTHENE 1600 PYRENE 1200			
S15-61 DUP	07/13/94	00	--	--	NA	BENZO(B)FLUORANTHENE 640	4,4'-DDD 31J(a,h,g) 4,4'-DDT 76J(a,h)	NA	NA
S15-62	07/13/94	00	--	--	NA	BENZO(A)ANTHRACENE 990 BENZO(A)PYRENE 940 BENZO(B)FLUORANTHENE 2800 BENZO(G,H,I)PERYLENE 880 CHRYSENE 1600 FLUORANTHENE 1100 INDENO(1,2,3-CD)PYRENE 680 PYRENE 1400	4,4'-DDT 380J(a,h)	NA	NA
S15-63	07/13/94	00	--	--	NA	BENZO(A)ANTHRACENE 1600 BENZO(A)PYRENE 1000J(e) BENZO(B)FLUORANTHENE 3600J(e) BENZO(G,H,I)PERYLENE 650J(e) CHRYSENE 2300 FLUORANTHENE 4800 INDENO(1,2,3-CD)PYRENE 630J(e) PHENANTHRENE 3200 PYRENE 3300	AROCLOLOR-1260 1000	NA	NA

* Sample 01 indicated represents the top of an 18-inch sample interval.

** USCS Interpretation (for soil borings only):

GW = well-graded gravel	SW = well-graded sand	ML = inorganic silt and very fine sands	MH = inorganic silts, micaceous or diatomaceous fine sand or silty soils
GP = poorly-graded gravel	SP = poorly-graded sand	CL = inorganic clay, low-med plasticity	CH = inorganic clay, high plasticity
GM = silty gravel	SM = silty sand	OL = organic silts and organic silty clays	OH = organic silt/clay, med - high plasticity
GC = clayey gravel	SC = clayey sand		PT = peat

*** Field screening results were obtained using a photoionization detector calibrated using a 100 ppm/v isobutylene standard gas (for soil borings only).

Analytical Data Comments:	ug/kg = Micrograms per kilogram	ND = Analytes reported below detection limits
	ug/L = Micrograms per liter	NA = Not Analyzed
	J = Value estimated at reported concentration	ppm/v = Parts per million volume
		PCBs = Polychlorinated Biphenyls

Analytical QA/QC Comments:	(a) - Surrogate recovery problem	(e) - Internal standards problems
	(b) - Blank contamination problems	(f) - Calibration problems
	(c) - Matrix spike recovery problems	(g) - Quantification below reporting limit
	(d) - Duplicate (precision) problems	(h) - Other problems, refer to data validation narrative

"--" = Not Applicable

TABLE 16-3

**METAL RESULTS IN SOIL EXCEEDING TEN TIMES THE STLC
FROM SITE 15
CTO 280
ALAMEDA NAVAL AIR STATION**

Sample Location and Depth	Sample Date	Metal	Detected Concentration (mg/kg)	STLC x 10 (mg/kg) ^(a)
S15-56-0	07/13/94	LEAD	132	50.00
S15-57-0	07/13/94	COPPER	259 J	250.00
	07/13/94	LEAD	249	50.00
S15-58-0	07/13/94	LEAD	546	50.00
S15-59-0	07/13/94	LEAD	128	50.00
S15-60-0	07/13/94	LEAD	597	50.00
S15-61-0	07/13/94	LEAD	954	50.00
S15-61-0Dup	07/13/94	LEAD	589	50.00
S15-62-0	07/13/94	LEAD	785	50.00
S15-63-0	07/13/94	LEAD	251	50.00

Note: ^(a) For the purpose of a screening criteria for this document, soil concentrations have been compared to a value equal to 10 times the STLC.

J - Estimated Concentration

STLC - Solubility Threshold Limit Concentration

SUMMARY OF GROUNDWATER ORGANIC CHEMICAL ANALYSES AND TDS FROM SITE 15
CTO 280
ALAMEDA NAVAL AIR STATION

WELL NO.	WATER BEARING ZONE	SAMPLE DATE	VOLATILE ORGANIC COMPOUNDS (ug/L)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/L)	PESTICIDES, PCB'S AND DIOXINS (ug/L)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/L)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/L)	TOTAL DISSOLVED SOLIDS (mg/L)
M15-01	1	10/25/94	ND	ND	ND	TPHC AS MOTOR OIL 600J(h)	ND	2440
M15-03	1	10/25/94	ND	ND	ND	TPHC AS MOTOR OIL 220J(h)	ND	1130
DHP-S15-01	2	08/03/94	ND	NA	NA	NA	NA	35300
DHP-S13-03	2	08/03/94	ND	NA	NA	NA	NA	48600

Analytical Data Comments: ug/kg = Micrograms per kilogram

ug/L = Micrograms per liter

J = Value estimated at reported concentration

SHP = "Shallow" HydroPunch obtained from first water-bearing zone.

DHP = "Deep" HydroPunch obtained from second water-bearing zone.

ND = Analytes reported below detection limits

NA = Not Analyzed

ppm/v = Parts per million volume

PCBs = Polychlorinated Biphenyls

Analytical QA/QC Comments:

- (a) - Surrogate recovery problem
- (b) - Blank contamination problems
- (c) - Matrix spike recovery problems
- (d) - Duplicate (precision) problems

- (e) - Internal standards problems
- (f) - Calibration problems
- (g) - Quantification below reporting limit
- (h) - Other problems, refer to data validation narrative

TABLE 16-5

**METAL RESULTS IN GROUNDWATER EXCEEDING 95 PERCENT/95 PERCENT STI
FROM SITE 15
CTO 280
ALAMEDA NAVAL AIR STATION**

Sample Location	Sample Date	Metal	Detected Concentration (ug/L)	Upper Tolerance Limit (ug/L) ^(a)
M15-01	10/25/94	CHROMIUM	15.1	3.2
	10/25/94	LEAD	1.7 J	1
M15-03	10/25/94	CHROMIUM	36.4	3.2

Note: ^(a) This value represents the upper tolerance interval of the 95 percent/95 percent STI (95/95 STI). The 95/95 STI is the value below which 95 percent of the groundwater samples are expected to fall 95 percent of the time, based on previous groundwater samples collected from NAS Alameda from areas of non-industrial use.

J - Estimated concentration

STI - Statistical Tolerance Interval

SUMMARY OF QUALITY CONTROL ORGANIC CHEMICAL ANALYSES FROM SITE 15
CTO 280
ALAMEDA NAVAL AIR STATION

WELL NO.	SAMPLE DATE	VOLATILE ORGANIC COMPOUNDS (ug/L)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/L)	PESTICIDES, PCB'S AND DIOXINS (ug/L)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/L)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/L)
S15-ER-01	07/13/94	NA	ND	ND	NA	NA
S15-ER-02	08/03/94	ND	NA	NA	NA	NA
S15-TB-01	08/03/94	ND	NA	NA	NA	NA

Analytical Data Comments: ug/kg = Micrograms per kilogram

ug/L = Micrograms per liter

J = Value estimated at reported concentration

TB = Trip Blank

ER = Equipment Rinsate

ND = Analytes reported below detection limits

NA = Not Analyzed

ppm/v = Parts per million volume

PCBs = Polychlorinated Biphenyls

Analytical QA/QC Comments:

- (a) - Surrogate recovery problem
- (b) - Blank contamination problems
- (c) - Matrix spike recovery problems
- (d) - Duplicate (precision) problems

- (e) - Internal standards problems
- (f) - Calibration problems
- (g) - Quantification below reporting limit
- (h) - Other problems, refer to data validation narrative

TABLE 17-1

SUMMARY OF FIELD WORK FOR SITE 16
CTO 280
ALAMEDA NAVAL AIR STATION

Cone Penetrometer Testing	Deep HydroPunch	Surface Soil Sampling	Soil Sampling	Shallow Wells	Groundwater Sampling	Non-Point Source Sampling	GeoProbe Sampling
CPT-S16-01	DHP-S16-01	S16-56	B16-10	M16-04	MWC2-1	NPS-S16-01	X
CPT-S16-02	DHP-S16-02	S16-57	B16-11		MWC2-2	NPS-S16-02	
CPT-S16-03	DHP-S16-03	S16-58	B16-12		MWC2-3		
CPT-S16-04	DHP-S16-04	S16-59			M16-04		
		S16-60					
		S16-61					
		S16-62					
		S16-63					
		S16-64					
		S16-65					
		S16-66					
		S16-67					
		S16-68					
		S16-69					
		S16-70					
		S16-71					

**SUMMARY OF SOIL ORGANIC CHEMICAL ANALYSES FROM SITE 16
CTO 280
ALAMEDA NAVAL AIR STATION**

WELL NO.	SAMPLE DATE	SAMPLE DEPTH (feet bgs)	USCS CLASSIFICATION **	FIELD SCREEN (ppm/v) ***	VOLATILE ORGANIC COMPOUNDS (ug/kg)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/kg)	PESTICIDES, PCB'S AND DIOXINS (ug/kg)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/kg)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/kg)
B16-10	08/19/94	0 0	GP	0 3	ND	ND	ND	NA	NA
B16-10	08/19/94	2 5	GP	0 3	ND	ND	ND	NA	NA
B16-10	08/19/94	5 0	SP	0 0	ND	ND	ND	NA	NA
B16-10 DUP	08/19/94	2 5	CL-SC	0 0	ND	ND	ND	NA	NA
B16-11	08/19/94	0 0	SP	0 0	ND	ND	ND	NA	NA
B16-11	08/19/94	2 5	SP	0 0	ND	ND	ND	NA	NA
B16-11	08/19/94	5 0	SP	0 0	ND	ND	ND	NA	NA
B16-12	08/19/94	0 0	SP	0 0	ND	ND	ND	NA	NA
B16-12	08/19/94	2 5	SP	0 0	ND	ND	ND	NA	NA
B16-12	08/19/94	5 0	SP	0 0	ND	ND	ND	NA	NA
M16-04	11/07/94	1 0	SP	0 0	ND	ND	ND	NA	NA
M16-04	11/07/94	2 0	SP	0 0	ND	ND	ND	NA	NA

**SUMMARY OF SOIL ORGANIC CHEMICAL ANALYSES FROM SITE 16
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)**

WELL NO.	SAMPLE DATE	SAMPLE DEPTH (feet bgs)	USCS CLASSIFICATION **	FIELD SCREEN (ppmv) ***	VOLATILE ORGANIC COMPOUNDS (ug/kg)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/kg)	PESTICIDES, PCB'S AND DIOXINS (ug/kg)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/kg)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/kg)
M16-04	11/07/94	5.0	SP	0.0	ND	ND	ND	NA	NA
M16-04 DUP	11/07/94	3.0	SP	0.0	ND	ND	ND	NA	NA
S16-56	07/15/94	0.0	--	--	NA	ND	ND	NA	NA
S16-57	07/25/94	0.0	--	--	NA	ND	ND	NA	NA
S16-58	07/14/94	0.0	--	--	NA	ND	ND	NA	NA
S16-59	07/14/94	0.0	--	--	NA	ND	ND	NA	NA
S16-60	07/14/94	0.0	--	--	NA	ND	ND	NA	NA
S16-61	07/14/94	0.0	--	--	NA	ND	ND	NA	NA
S16-62	07/15/94	0.0	--	--	NA	ND	ND	NA	NA
S16-63	07/15/94	0.0	--	--	NA	ND	4,4'-DDT 8.5J(h)	NA	NA
S16-63 DUP	07/15/94	0.0	--	--	NA	ND	ND	NA	NA
S16-64	07/25/94	0.0	--	--	NA	ND	4,4'-DDT 3.9J(h)	NA	NA

**SUMMARY OF SOIL ORGANIC CHEMICAL ANALYSES FROM SITE 16
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)**

WELL NO.	SAMPLE DATE	SAMPLE DEPTH (feet bgs)	USCS CLASSIFICATION **	FIELD SCREEN (ppm/v) ***	VOLATILE ORGANIC COMPOUNDS (ug/kg)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/kg)	PESTICIDES, PCB'S AND DIOXINS (ug/kg)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/kg)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/kg)
S16-65	07/14/94	0 0	--	--	NA	ND	ND	NA	NA
S16-66	07/14/94	0 0	--	--	NA	ND	ND	NA	NA
S16-67	07/15/94	0 0	--	--	NA	ND	ND	NA	NA
S16-68	07/15/94	0 0	--	--	NA	ND	4,4'-DDD 4.3J(h) 4,4'-DDE 4.2J(h) 4,4'-DDT 22J(h) AROCOR-1260 260	NA	NA
S16-69	07/15/94	0 0	--	--	NA	ND	ND	NA	NA
S16-70	07/15/94	0 0	--	--	NA	ND	4,4'-DDT 5.4J(h)	NA	NA
S16-71	07/14/94	0 0	--	--	NA	ND	ND	NA	NA
GPS16-001	08/09/94	6 0	--	--	ND	PHENOL: 580	ND	NA	NA
GPS16-002	08/09/94	6 0	--	--	ND	ND	ND	NA	NA
GPS16-003	08/09/94	6 0	--	--	ND	ND	ND	NA	NA

* Sample depth indicated represents the top of an 18-inch sample interval.

** USCS Interpretation (for soil borings only):

GW = well-graded gravel	SW = well-graded sand	ML = inorganic silt and very fine sands	MH = inorganic silts, micaceous or diatomaceous
GP = poorly-graded gravel	SP = poorly-graded sand	CL = inorganic clay, low-med plasticity	fine sand or silty soils
GM = silty gravel	SM = silty sand	OL = organic silts and organic silty clays	CH = inorganic clay, high plasticity
GC = clayey gravel	SC = clayey sand		OH = organic silt/clay, med - high plasticity
			PT = peat

*** Field screening results were obtained using a photoionization detector calibrated using a 100 ppm/v isobutylene standard gas (for soil borings only).

Analytical Data Comments:	ug/kg = Micrograms per kilogram	ND = Analytes reported below detection limits
	ug/L = Micrograms per liter	NA = Not Analyzed
	J = Value estimated at reported concentration	ppm/v = Parts per million volume
		PCBs = Polychlorinated Biphenyls

Analytical QA/QC Comments:	(a) - Surrogate recovery problem	(e) - Internal standards problems
	(b) - Blank contamination problems	(f) - Calibration problems
	(c) - Matrix spike recovery problems	(g) - Quantification below reporting limit
	(d) - Duplicate (precision) problems	(h) - Other problems, refer to data validation narrative

"-" = Not Applicable

GPS = Soil Sample obtained with GeoProbe device.

TABLE 17-3

**METAL RESULTS IN SOIL EXCEEDING TEN TIMES THE STLC
FROM SITE 16
CTO 280
ALAMEDA NAVAL AIR STATION**

Sample Location and Depth	Sample Date	Metal	Detected Concentration (mg/kg)	STLC x 10 (mg/kg) ^(a)
S16-58	07/14/94	LEAD	56.9	50.00
S16-68	07/15/94	LEAD	99.1 J	50.00
S16-70	07/15/94	LEAD	85.8 J	50.00

Note: ^(a) For the purpose of a screening criteria for this document, soil concentrations have been compared to a value equal to 10 times the STLC.

J - Estimated Concentration

STLC - Solubility Threshold Limit Concentration

SUMMARY OF GROUNDWATER ORGANIC CHEMICAL ANALYSES AND TDS FROM SITE 16
CTO 280
ALAMEDA NAVAL AIR STATION

WELL NO.	WATER BEARING ZONE	SAMPLE DATE	VOLATILE ORGANIC COMPOUNDS (ug/L)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/L)	PESTICIDES, PCB'S AND DIOXINS (ug/L)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/L)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/L)	TOTAL DISSOLVED SOLIDS (mg/L)
M16-04	1	12/01/94	1,2-DICHLOROETHENE (TOTAL): 1 TRICHLOROETHENE: 1	ND	ND	NA	NA	200
MWC2-1	1	10/21/94	ND	ND	ND	NA	NA	382
MWC2-2	1	10/24/94	ND	1,2-DICHLOROBENZENE: 3700 1,3-DICHLOROBENZENE: 79 1,4-DICHLOROBENZENE: 300	ND	NA	NA	347
MWC2-3	1	10/24/94	ND	ND	ND	NA	NA	149
DHP-S16-01	2	07/22/94	ND	ND	NA	NA	NA	19600
DHP-S16-02	2	07/21/94	ND	ND	NA	NA	NA	7080
DHP-S16-03	2	07/22/94	ND	ND	NA	NA	NA	20700
DHP-S16-04	2	08/26/94	ND	ND	NA	NA	NA	1960
GPW16-001	1	08/09/94	CARBON DISULFIDE: 1	ND	ND	NA	NA	202 J(h)
GPW16-002	1	08/09/94	CARBON DISULFIDE: 1	ND	ND	NA	NA	208
GPW16-003	1	08/09/94	1,2-DICHLOROETHENE (TOTAL): 1	ND	ND	NA	NA	242 J(h)
GPW16-004	1	08/09/94	ND	ND	ND	NA	NA	126
GPW16-005	1	08/09/94	ND	ND	ND	NA	NA	ND
GPW16-006	1	08/09/94	ND	NA	NA	NA	NA	NA

Analytical Data

Comments: ug/kg = Micrograms per kilogram

ug/L = Micrograms per liter

J = Value estimated at reported concentration

SHP = "Shallow" HydroPunch obtained from first water-bearing zone.

DHP = "Deep" HydroPunch obtained from second water-bearing zone.

ND = Analytes reported below detection limits

NA = Not Analyzed

ppm/v = Parts per million volume

PCBs = Polychlorinated Biphenyls

Analytical QA/QC Comments:

(a) - Surrogate recovery problem

(b) - Blank contamination problems

(c) - Matrix spike recovery problems

(d) - Duplicate (precision) problems

(e) - Internal standards problems

(f) - Calibration problems

(g) - Quantification below reporting limit

(h) - Other problems, refer to data validation narrative

GPW = GeoProbe Sample from First Water Bearing Zone.

TABLE 17-5

**METAL RESULTS IN GROUNDWATER EXCEEDING 95 PERCENT/95 PERCENT STI
FROM SITE 16
CTO 280
ALAMEDA NAVAL AIR STATION**

Sample Location	Sample Date	Metal	Detected Concentration (ug/L)	Upper Tolerance Limit (ug/L) ^(a)
GPW16-003	08/09/94	ZINC	29.6	25.7
GPW16-005	08/09/94	ZINC	30.2	25.7
MWC2-1	10/21/94	LEAD	1.5 J	1
MWC2-3	10/24/94	SELENIUM	4.1 J	1.0

Note: ^(a) This value represents the upper tolerance interval of the 95 percent/95 percent STI (95/95 STI). The 95/95 STI is the value below which 95 percent of the groundwater samples are expected to fall 95 percent of the time, based on previous groundwater samples collected from NAS Alameda from areas of non-industrial use.

J - Estimated concentration

STI - Statistical Tolerance Interval

SUMMARY OF NON POINT SOURCE ORGANIC CHEMICAL ANALYSES FROM SITE 16
CTO 280
ALAMEDA NAVAL AIR STATION

NPS I.D.	SAMPLE DATE	VOLATILE ORGANIC COMPOUNDS (ug/kg)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/kg)	PESTICIDES, PCB'S AND DIOXINS (ug/kg)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/kg)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/kg)
NPS-S16-01	07/20/94	ETHYLBENZENE 35 TETRACHLOROETHENE 14J(g) TOLUENE 24 XYLENE (TOTAL) 280	2-METHYLNAPHTHALENE 2600 NAPHTHALENE 1400	ND	NA	NA
NPS-S16-02	07/19/94	ND	ND	4,4'-DDD 34J(a,h) AROCOR-1260 390J(a)	NA	NA
NPS-S16-02DUP	07/19/94	ND	ND	4,4'-DDD 130J(a) 4,4'-DDE 57J(a) 4,4'-DDT 140J(a,h) AROCOR-1260 570J(a)	NA	NA

Analytical Data Comments: ug/kg = Micrograms per kilogram

ug/L = Micrograms per liter

J = Value estimated at reported concentration

ND = Analytes reported below detection limits

NA = Not Analyzed

ppm/v = Parts per million volume

PCBs = Polychlorinated Biphenyls

Analytical QA/QC Comments: (a) - Surrogate recovery problem

(b) - Blank contamination problems

(c) - Matrix spike recovery problems

(d) - Duplicate (precision) problems

(e) - Internal standards problems

(f) - Calibration problems

(g) - Quantification below reporting limit

(h) - Other problems, refer to data validation narrative

SUMMARY OF QUALITY CONTROL ORGANIC CHEMICAL ANALYSES FROM SITE 16
CTO 280
ALAMEDA NAVAL AIR STATION

WELL NO.	SAMPLE DATE	VOLATILE ORGANIC COMPOUNDS (ug/L)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/L)	PESTICIDES, PCB'S AND DIOXINS (ug/L)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/L)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/L)
S16-ER-01	07/14/94	NA	ND	ND	NA	NA
S16-ER-02	07/15/94	NA	ND	ND	NA	NA
S16-ER-03	07/21/94	ND	ND	NA	NA	NA
S16-ER-04	07/25/94	NA	ND	ND	NA	NA
S16-TB-01	07/21/94	ND	NA	NA	NA	NA
S16-TB-02	07/22/94	ND	NA	NA	NA	NA
S16-TB-03	07/25/94	ND	NA	NA	NA	NA
S16-TB-04	08/19/94	ND	NA	NA	NA	NA

Analytical Data Comments: ug/kg = Micrograms per kilogram

ug/L = Micrograms per liter

J = Value estimated at reported concentration

TB = Trip Blank

ER = Equipment Rinsate

ND = Analytes reported below detection limits

NA = Not Analyzed

ppm/v = Parts per million volume

PCBs = Polychlorinated Biphenyls

Analytical QA/QC Comments:

- (a) - Surrogate recovery problem
- (b) - Blank contamination problems
- (c) - Matrix spike recovery problems
- (d) - Duplicate (precision) problems

- (e) - Internal standards problems
- (f) - Calibration problems
- (g) - Quantification below reporting limit
- (h) - Other problems, refer to data validation narrative

TABLE 18-1

**SUMMARY OF FIELD WORK FOR SITE 19
CTO 280
ALAMEDA NAVAL AIR STATION**

Cone Penetrometer Testing	Shallow HydroPunch	Deep HydroPunch	Soil Sampling	Shallow Wells	Deep Wells	Groundwater Sampling	NPS Sampling
CPT-S19-01	SHP-S19-05	DHP-S19-01	B19-17	M19-05	D19-01	MWD13-1	NPS-S19-01
CPT-S19-02	HP-S19-01	DHP-S19-02	B19-18			MWD13-2	NPS-S19-02
CPT-S19-03	HP-S19-02	DHP-S19-03	B19-19			MWD13-3	
CPT-S19-04	HP-S19-03	DHP-S19-04	M19-05			MWD13-4	
CPT-S19-05						M19-05 D139-01	

**SUMMARY OF SOIL ORGANIC CHEMICAL ANALYSES FROM SITE 19
CTO 280
ALAMEDA NAVAL AIR STATION**

WELL NO.	SAMPLE DATE	SAMPLE DEPTH (feet bgs)	USCS CLASSIFICATION **	FIELD SCREEN (ppm/v) ***	VOLATILE ORGANIC COMPOUNDS (ug/kg)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/kg)	PESTICIDES, PCB'S AND DIOXINS (ug/kg)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/kg)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/kg)
B19-17	08/22/94	0 0	GW	0 0	NA	ND	NA	TPHC AS MOTOR OIL: 468000J(h)	TPHC AS UNLEADED GASOLINE 3300J(h)
B19-17	08/22/94	2 5	GW	0 0	ND	ND	NA	ND	ND
B19-17	08/22/94	5 0	SP	0 0	ND	ND	NA	ND	ND
B19-18	08/22/94	0 0	SW	0 0	NA	ND	NA	ND	ND
B19-18	08/22/94	2 5	SW	0 0	ND	ND	NA	TPHC AS MOTOR OIL: 97000J(h)	ND
B19-18	08/22/94	5 0	SW	0 0	ND	ND	NA	ND	ND
B19-18 DUP	08/22/94	5 0	SP	0 0	ND	ND	NA	ND	ND
B19-19	08/22/94	0 0	GW		NA	NA	NA	TPHC AS MOTOR OIL: 330000J(h)	ND
B19-19	08/22/94	2 5	GW		ND	NA	NA	ND	ND
B19-19	08/22/94	5 0	GW		ND	NA	NA	ND	ND
M19-05	11/06/94	0 5	SP	0 0	ND	ND	NA	ND	ND
M19-05	11/06/94	2 5	SP	0 0	ND	ND	NA	TPHC AS MOTOR OIL: 36000J(h)	ND

SUMMARY OF SOIL ORGANIC CHEMICAL ANALYSES FROM SITE 19
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

WELL NO.	SAMPLE DATE	SAMPLE DEPTH (feet bgs)	USCS CLASSIFICATION **	FIELD SCREEN (ppmv) ***	VOLATILE ORGANIC COMPOUNDS (ug/kg)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/kg)	PESTICIDES, PCB'S AND DIOXINS (ug/kg)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/kg)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/kg)
M19-05	11/06/94	4.5	SP	0.0	ND	ND	NA	ND	ND

* Sample depth indicated represents the top of an 18-inch sample interval.

** USCS Interpretation (for soil borings only):

GW = well-graded gravel	SW = well-graded sand	ML = inorganic silt and very fine sands	MH = inorganic silts, micaceous or diatomaceous fine sand or silty soils
GP = poorly-graded gravel	SP = poorly-graded sand	CL = inorganic clay, low-med plasticity	CH = inorganic clay, high plasticity
GM = silty gravel	SM = silty sand	OL = organic silts and organic silty clays	OH = organic silt/clay, med - high plasticity
GC = clayey gravel	SC = clayey sand		PT = peat

*** Field screening results were obtained using a photoionization detector calibrated using a 100 ppm/v isobutylene standard gas (for soil borings only).

Analytical Data Comments:	ug/kg = Micrograms per kilogram	ND = Analytes reported below detection limits
	ug/L = Micrograms per liter	NA = Not Analyzed
	J = Value estimated at reported concentration	ppm/v = Parts per million volume
		PCBs = Polychlorinated Biphenyls

Analytical QA/QC Comments:	(a) - Surrogate recovery problem	(e) - Internal standards problems
	(b) - Blank contamination problems	(f) - Calibration problems
	(c) - Matrix spike recovery problems	(g) - Quantification below reporting limit
	(d) - Duplicate (precision) problems	(h) - Other problems, refer to data validation narrative

"-" = Not Applicable

SUMMARY OF GROUNDWATER ORGANIC CHEMICAL ANALYSES AND TDS FROM SITE 19
CTO 280
ALAMEDA NAVAL AIR STATION

WELL NO.	WATER BEARING ZONE	SAMPLE DATE	VOLATILE ORGANIC COMPOUNDS (ug/L)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/L)	PESTICIDES, PCB'S AND DIOXINS (ug/L)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/L)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/L)	TOTAL DISSOLVED SOLIDS (mg/L)
D19-01	2	12/16/94	ND	ND	ND	ND	ND	14000
HP-S19-01	1	09/01/94	NA	NA	NA	TPHC AS MOTOR OIL: 3240J(h)	TPHC AS UNLEADED GASOLINE 71J(h)	NA
HP-S19-02	1	08/30/94	NA	NA	NA	TPHC AS MOTOR OIL: 220J(h)	ND	NA
HP-S19-03	1	08/31/94	NA	NA	NA	TPHC AS MOTOR OIL: 600J(h)	TPHC AS UNLEADED GASOLINE 64J(h)	NA
M19-05	1	12/13/94	TOLUENE: 5 XYLENE (TOTAL): 2	ND	ND	ND	ND	3300
M19-05 DUP	1	12/13/94	TOLUENE: 5 XYLENE (TOTAL): 2	ND	ND	TPHC AS MOTOR OIL: 580J(h)	ND	3300
MWD13-1	1	10/25/94	1,1-DICHLOROETHANE 3 1,2-DICHLOROETHENE (TOTAL): 2	ND	ND	TPHC AS MOTOR OIL: 460J(h)	ND	1110
MWD13-2	1	10/24/94	1,1-DICHLOROETHANE 2	ND	ND	TPHC AS MOTOR OIL: 540J(h)	ND	465
MWD13-3	1	10/25/94	1,1,1-TRICHLOROETHANE 2 1,1-DICHLOROETHANE 7	ND	ND	TPHC AS MOTOR OIL: 390J(h)	ND	335
MWD13-4	1	10/25/94	1,1-DICHLOROETHANE 11 BENZENE 2 TETRACHLOROETHENE 4	ND	ND	TPHC AS MOTOR OIL: 380J(h)	ND	796
DHP-S19-01	2	08/01/94	ND	ND	NA	TPHC AS MOTOR OIL: 460J(h)	ND	2380
DHP-S19-02	2	08/01/94	1,1,1-TRICHLOROETHANE 1 1,1-DICHLOROETHANE 30 1,1-DICHLOROETHENE 3 1,2-DICHLOROETHENE (TOTAL) 3 TETRACHLOROETHENE 3 TRICHLOROETHENE 2	ND	NA	TPHC AS MOTOR OIL: 570J(f,h)	ND	630

SUMMARY OF GROUNDWATER ORGANIC CHEMICAL ANALYSES AND TDS FROM SITE 19
CTO 280
ALAMEDA NAVAL AIR STATION
(Continued)

WELL NO.	WATER BEARING ZONE	SAMPLE DATE	VOLATILE ORGANIC COMPOUNDS (ug/L)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/L)	PESTICIDES, PCB'S AND DIOXINS (ug/L)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/L)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/L)	TOTAL DISSOLVED SOLIDS (mg/L)
DHP-S19-02	2	08/01/94	1,1-DICHLOROETHANE: 27 1,1-DICHLOROETHENE: 2 1,2-DICHLOROETHENE (TOTAL): 3 TETRACHLOROETHENE: 5 TRICHLOROETHENE: 4	ND	NA	TPHC AS MOTOR OIL: 540J(h)	ND	760
DHP-S19-03	2	09/01/94	ND	ND	NA	TPHC AS MOTOR OIL: 720J(h)	ND	1600
DHP-S19-04	2	08/18/94	1,1-DICHLOROETHANE: 4 1,2-DICHLOROETHANE: 0.7 ACETONE: 38J(f)	ND	NA	TPHC AS MOTOR OIL: 580J(h)	ND	3950
SHP-S19-05	1	08/18/94	NA	NA	NA	TPHC AS MOTOR OIL: 1170J(h)	ND	NA

Analytical Data Comments: ug/kg = Micrograms per kilogram

ug/L = Micrograms per liter

J = Value estimated at reported concentration

SHP = "Shallow" HydroPunch obtained from first water-bearing zone.

DHP = "Deep" HydroPunch obtained from second water-bearing zone.

ND = Analytes reported below detection limits

NA = Not Analyzed

ppm/v = Parts per million volume

PCBs = Polychlorinated Biphenyls

Analytical QA/QC Comments:

(a) - Surrogate recovery problem

(b) - Blank contamination problems

(c) - Matrix spike recovery problems

(d) - Duplicate (precision) problems

(e) - Internal standards problems

(f) - Calibration problems

(g) - Quantification below reporting limit

(h) - Other problems, refer to data validation narrative

TABLE 18-4

**METAL RESULTS IN GROUNDWATER EXCEEDING 95 PERCENT/95 PERCENT STI
FROM SITE 19
CTO 280
ALAMEDA NAVAL AIR STATION**

Sample Location	Sample Date	Metal	Detected Concentration (ug/L)	Upper Tolerance Limit (ug/L) ^(a)
M19-05	12/13/94	NICKEL	27.9 J	6.6
M19-05 Dup	12/13/94	COBALT	10.2 J	8.6
	12/13/94	NICKEL	25.5 J	6.6
MWD13-1	10/25/94	NICKEL	27.9 J	6.6
	10/25/94	SELENIUM	3.2 J	1.0
MWD13-2	10/24/94	NICKEL	24.1 J	6.6
	10/24/94	SELENIUM	3.5 J	1.0
	10/24/94	ZINC	65.3	25.7
MWD13-3	10/25/94	LEAD	2.9 J	1
	10/25/94	NICKEL	11.2 J	6.6

Note: ^(a) This value represents the upper tolerance interval of the 95 percent/95 percent STI (95/95 STI). The 95/95 STI is the value below which 95 percent of the groundwater samples are expected to fall 95 percent of the time, based on previous groundwater samples collected from NAS Alameda from areas of non-industrial use.

J - Estimated concentration

STI - Statistical Tolerance Interval

SUMMARY OF NON POINT SOURCE ORGANIC CHEMICAL ANALYSES FROM SITE 19
CTO 280
ALAMEDA NAVAL AIR STATION

NPS I.D.	SAMPLE DATE	VOLATILE ORGANIC COMPOUNDS (ug/kg)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/kg)	PESTICIDES, PCB'S AND DIOXINS (ug/kg)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/kg)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/kg)
NPS-S19-01	07/18/94	ND	ND	NA	TPHC AS MOTOR OIL: 900000J(f,h)	ND
NPS-S19-02	07/18/94	1,1,1-TRICHLOROETHANE: 180000J(a) 1,2-DICHLOROETHENE (TOTAL): 130000J(a) TRICHLOROETHENE: 94000J(a)	1,2-DICHLOROBENZENE: 8000 BIS(2-ETHYLHEXYL)PHTHALATE: 99000J(h)	NA	TPHC AS DIESEL: 8930000J(h)	TPHC AS UNLEADED GASOLINE 2060000J(h)

Analytical Data Comments: ug/kg = Micrograms per kilogram

ug/L = Micrograms per liter

J = Value estimated at reported concentration

ND = Analytes reported below detection limits

NA = Not Analyzed

ppm/v = Parts per million volume

PCBs = Polychlorinated Biphenyls

Analytical QA/QC Comments: (a) - Surrogate recovery problem
 (b) - Blank contamination problems
 (c) - Matrix spike recovery problems
 (d) - Duplicate (precision) problems

(e) - Internal standards problems
 (f) - Calibration problems
 (g) - Quantification below reporting limit
 (h) - Other problems, refer to data validation narrative

SUMMARY OF QUALITY CONTROL ORGANIC CHEMICAL ANALYSES FROM SITE 19
CTO 280
ALAMEDA NAVAL AIR STATION

WELL NO.	SAMPLE DATE	VOLATILE ORGANIC COMPOUNDS (ug/L)	SEMIVOLATILE ORGANIC COMPOUNDS (ug/L)	PESTICIDES, PCB'S AND DIOXINS (ug/L)	TOTAL PETROLEUM HYDROCARBONS EXTRACTABLE (ug/L)	TOTAL PETROLEUM HYDROCARBONS PURGEABLE (ug/L)
S19-ER-01	08/22/94	ND	ND	NA	ND	ND
S19-ER-04	09/01/94	1,2-DICHLOROETHANE: 0.9	ND	NA	ND	ND
S19-ER-05	08/31/94	NA	NA	NA	ND	ND
S19-ER-06	08/30/94	NA	NA	NA	ND	ND
S19-TB-01	08/01/94	2-BUTANONE: 57.J(f)	NA	NA	NA	NA
S19-TB-02	08/01/94	2-BUTANONE: 300.J(f)	NA	NA	NA	NA
S19-TB-03	08/30/94	1,2-DICHLOROETHANE: 2	NA	NA	NA	NA
S19-TB-04	08/31/94	1,2-DICHLOROETHANE: 1	NA	NA	NA	NA
S19-TB-05	09/01/94	1,2-DICHLOROETHANE: 2	NA	NA	NA	NA

Analytical Data Comments: ug/kg = Micrograms per kilogram

ug/L = Micrograms per liter

J = Value estimated at reported concentration

TB = Trip Blank

ER = Equipment Rinsate

ND = Analytes reported below detection limits

NA = Not Analyzed

ppm/v = Parts per million volume

PCBs = Polychlorinated Biphenyls

Analytical QA/QC Comments: (a) - Surrogate recovery problem

(b) - Blank contamination problems

(c) - Matrix spike recovery problems

(d) - Duplicate (precision) problems

(e) - Internal standards problems

(f) - Calibration problems

(g) - Quantification below reporting limit

(h) - Other problems, refer to data validation narrative

FINAL
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
DATA TRANSMITTAL MEMORANDUM
SITES 1, 2, 3, RUNWAY AREA, 6, 7A, 7B, 7C, 9,
10B, 11, 13, 15, 16, AND 19

DATED 01 MAY 1996

THIS RECORD CONTAINS MULTIPLE VOLUMES
WHICH HAVE BEEN ENTERED SEPARATELY

VOLUME 2 OF 2 IS FILED AS ADMINISTRATIVE
RECORD NO. N00236.001215